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Early modern stockings in museums in the Czech Republic

Abstract

Knitted stockings from six burials dating from 1576 to 1626 and three without clear dating were examined. All the stockings have fully shaped legs and triangular gussets bordered on all three sides with patterns of reverse loops, along which the foot was shaped by both decreases and increases. Right-leaning decreases were used mostly; left-leaning decreases were used only in some stockings, exclusively in the upper part of the gusset on the proper left side of the stocking. For increasing, only raised (row below lifted) increases were used. Their asymmetric position in several stockings shows that some of the early knitters understood an increase to be two loops knitted from one parent loop, and for some it was only an added loop. Instead of the usual method of picking up new loops for gussets, the heel flap selvages were probably whipstitched in several stockings, and these sewn stitches were then used as the base for knitting the gussets. A comparison of the stockings from the Czech Republic to the stockings from the same period found in other European countries suggests the possibility of using a range of construction types for determining their provenance.

Keywords: Knit, stockings, silk, 16th century, 17th century, shaping

Introduction

Until recently, little attention has been paid to archaeological knitwork in the Czech Republic. Reports that did note it usually mentioned only the dimensions of the objects, and that they were of simple knit fabric, sometimes with patterns of reverse loops (although not always in such unambiguous terms). Some handknitted stockings were considered to be frame-knitted due to the fine gauge of the fabrics, and a wale of reverse loops along the back of the leg (a marker rib) was often mistaken for a real seam. The main aim of this paper is to describe in detail the knitted stockings briefly introduced at NESAT XIII (Odstrčilová 2017), using the newly proposed terminology and protocol for recording knitwork (see Malcolm-Davies et al. 2018, 10-24, in this issue). However, the research also revealed evidence that some working methods used by 16th and 17th century knitters differed from those of modern knitters, which suggests ways in which the proposed terminology may expand in the future.

Methodology and terminology

The research presented here concentrates on collecting evidence for how the stockings were knitted.

Information on the materials, yarn characteristics and dimensions of the stockings were mostly copied from previous reports by textile historians and conservators. Terminology for the parts of the stockings (fig. 2) was taken from modern instructions for knitting socks (for example, Bush 2011), with two exceptions. In modern knitting instructions, foot often refers only to the part of the sock knitted after the heel is finished or its tubular part after the gussets are finished, and sole refers to the bottom half of the foot. The term foot in this paper corresponds with its anatomical meaning, referring to the whole bottom part of the stocking below the ankle, and sole refers to the triangular or trapezoid area delimited by two patterned lines (sometimes known as false seams but more accurately called marker ribs).

Overview of the stockings

Most of the stockings reported here were made from silk. The stocking from Opava was not analysed to identify the fibre, and there is conflicting information about the stockings of Tycho Brahe. The gauge varied from 50 to 100 wales and from 65 to 130 courses per 10 cm (see table 1).



Owner of the stockings	Burial date	Current location	Inventory/ accession number	Previous publications [or unpublished reports]	Dimensions: length, length of foot, width of top edge (if given)	Yarn diameter	Yarn single/plied/cabled/combined	Yarn twist	Gauge (wales x courses per 10 cm)	Current colour
Emperor Maximilian II.	1576	Prague Castle	HS 13746 PHA 26/08	Bravermanová, Koblířová and Samohýřlová 1995; Bravermanová 1997	81 cm, 27 cm *	NR	several 2-ply threads combined	I (ply: S)	60 x 65 (leg), 50 x 75 (gusset)	brown (goldish)
Tycho Brahe (stocking A)	1601	City of Prague Museum	86 565	[Pirník 1971]; [Vorlová 1974]; Bravermanová 1997	64 cm, 23 cm, 19 cm *	NR	several 2-ply threads combined	I (ply: Z)	90 x 80 *	beige
Tycho Brahe (stocking B)		Prague Archbishopric	31-105327/3	[Kneřřlová 2017]	63 cm, 22 cm, 17 cm *				70 x 100	
Emperor Rudolf II.	1612	Prague Castle	HS 13757 PHA 27/04	Bravermanová and Čierna 1997; Bravermanová 1997	76 cm, 26 cm (76.5 cm, 27 cm) *	NR	plied	S *	100 x 100	brown (goldish)
Jan Diviš ze Žerotína	1616	Museum of the Brno Region in Ivančice	10/93	[Otařřská 2010]	62 cm, 21 cm (deformed, originally longer), 19 cm *	NR	2-ply *	2z/S *	70 x 120 *	brown (dark)
Markéta Františka Lobkowitz, née Dietrichstein	1617	Regional Museum in Mikulov	T 835	[Otařřská 2006]; Pietsch 2008	52 cm, 17.5 cm, 15.5 cm *	NR	2-ply *	2z/S *	70 x 90 *	brown (reddish), with ornaments in metallic yarn
Václav Vilém Popel Lobkowitz	1626	Regional Museum in Mikulov	T 1125	[Otařřská 2009]	57 cm, 27 cm *	NR	3-ply *	3z/S *	70 x 120 *	brown (greyish)
A member of the Mošovský family	1599-1652	Silesian Museum in Opava	1981/5		57 cm, c. 28 cm	NR	2-ply ? combined	I or slight S	70 x 100	brown (dark)
unknown	NA	South-Moravian Museum in Znojmo	A31457/28	[Komendová 2008]	NR	NR	3? 2-ply threads combined or cabled	I or slight S (ply: S)	90 x 150; 80 x 130; 60 x 90 (in different fragments)	brown (one foot knitted in three different shades)
unknown	NA	Brno City Museum	A32/2011 1166/1	[Šulcová 2012]	19 x 14 cm *	0.508 mm	single ?	I or slight S *	55 x 100	brown (dark)

Table 1: General data on the stockings, yarn, gauge and colour - * indicates information taken from previous publications or reports. Notes: NA = not available; NR = not recorded

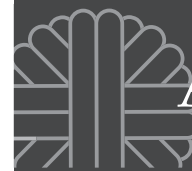


Fig. 1: One of the stockings and the garter which belonged to Markéta Františka Lobkowitz, née Dietrichstein (Image: V. Otavská, © Regional Museum in Mikulov)

The orientation of well-preserved stockings in wear (thigh to toe) is clear but this should not be confused with the orientation of the knitwork. Even though the cast-on edge was clearly visible in only one stocking (in others it was either obscured by a curled edge or by a sewing thread which attached a lining fabric), the orientation of the knitwork was recognised by the direction of the V shapes of the face loops next to reverse loops or loops in a different colour. This orientation of the loops helps to identify the shaping by distinguishing the decreases from the increases (fig. 3).

All examined stockings had a marker rib running along the back of the leg, formed by alternating face and reverse loops placed one above another (a single ridge pattern in a single wale). This marker rib was a central line along which the leg was shaped: narrowed by decreases in the thigh, then slightly widened by

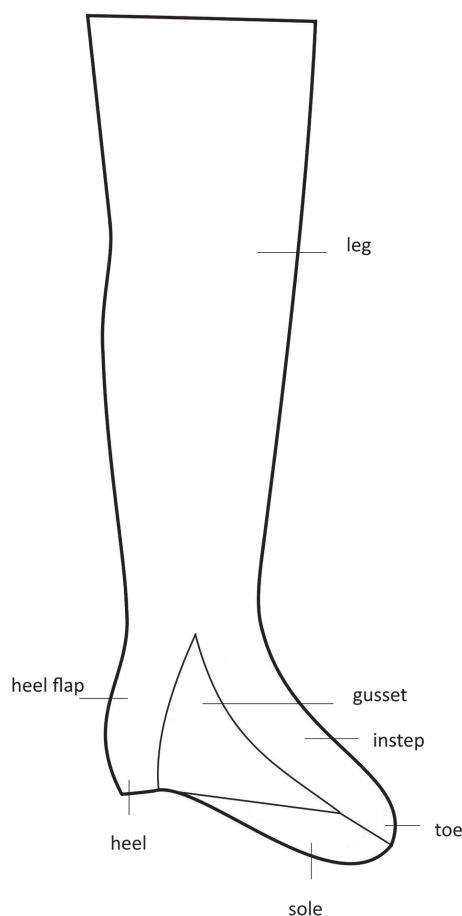


Fig. 2: Terminology for parts of a stocking. See fig. 1 for application to an example of an extant artefact (Image: S. Odstrčilová).

several increases under the knee, and narrowed by decreases in the calf. This shaping was similar for all the stockings, but the distances between shaping loops in the vertical and horizontal directions varied.

In several cases, the decreases along the central line ran all the way to the tip of the heel. If they stopped in the ankle area, the heel flap was shaped by decreases along its sides. None of the stockings had an unshaped rectangular heel flap, as is usual in later stockings and modern socks. All the heels were knitted from selvedge to selvedge, without using short rows for turning the heel (see Bush 2011, 51 or Hemmons Hiatt 2012, 103 for an explanation of this technique) and they were finished by the seam at the bottom. Among the preserved heels, the type known as a shaped common heel (Bush 2011, 57) prevailed. While one loop from every other course of the heel flap selvedge is usually



Owner/location	Leg			Heel			
	Frequency of decs in thigh	Frequency of decs in calf	Frequency of decs under knee	Position of heel flap decs	Frequency of heel flap decs	Decs in tip of heel	Under-heel seam
Emperor Maximilian II	NA	4	NA	lateral	4-8 (irregularly)	NA	NA
Tycho Brahe	A	NA, 10				8x?	<->
	B	10	6 (5x)	lateral	8	9x	recto: <-> ; verso: chain of cast-off loops
Emperor Rudolf II	A	12 (12 cm), 8 (13 cm), 4 (8 cm)	6 (mostly)			5x	
	B	7 cm without decs, 12 (4 cm), 8 (8 cm), 10 (8 cm), 4 (5 cm)	6	central	6-8	6x	<->
Jan Diviš ze Žerotína	1/4 of thigh length without decs, 14 (2x), 8 (1x), 10 (1x), 8 (c. 4x), 6 (c. 15x)	6-8 (mostly)	8-10 (7x)	central	6 (mostly)	NA	NR
Markéta Františka Lobkowitz, née Dietrichstein	ornamental band without decs, 8	8	8 (3x)	lateral	10 (10x)	9x	<->
Václav Vilém Popel Lobkowitz	8-18 (almost from the top)	4-10 (mostly 6)	4-10 (7x)	central	6 (mostly)	NR (covered)	<->
Opava	16 (8x; almost from the top)	6	10 (6x)	lateral	6	5x2 (Balbriggan type)	NA
Znojmo	NA	> 30 cs between decs	NA	central	NA	NA	NR
Brno	NA	10 (unknown part of leg)	NA	NA	NA	NA	recto: <-> ; verso: chain of cast-off loops

Table 2a: Shaping of the stockings. Frequency indicates decreases/increases in every *n*th course, number following in brackets gives number of repeats or the length of this section. Decreases in the tip of the heel always occurred in alternate courses, therefore only their number is given. Abbreviations: dec(s) = decrease(s), inc(s) = increase(s), c(s) = course(s), R = right (leaning) decrease/increase, L = left (leaning) decrease/increase, <-> indicates two loops orientated in the opposite direction joined by a single section of yarn (see *Under-heel seam* section)



Owner/location	Gusset			Sole	Toe			Type(s) of decs	Type of incs
	Ratio of heel flap welts and gusset loops	Method of making gusset loops	Frequency of decs		Shaping	Frequency of decs	Toe seam		
Emperor Maximilian II	2:3 or 3:4	picked-up	1 (8x); 2 (most of the gusset); near toe in one stocking 6 (1x), 4 (1x); in the other 4 (3x)	8; near toe c. 26 cs without incs	symmetrical	1 (8x)	yarn passed alternately through one sole loop and one instep loop	R	R
				6		1 (c. 16x), 2 (c. 10x)	<->		
Tycho Brahe	7:10	increased	1 (3/5 of heel flap height); 2 (3/5 of heel flap height); 2	6 (rarely 4)	symmetrical	2 (c. 20x)	recto: <-> ; verso: chain of cast-off loops	R, L	L
				8-16 (-24) (irregularly, sides differ)					
Emperor Rudolf II	4:5	indeterminate	1 (2/3 of heel flap height); 4	8 mostly, 1/3 near toe without incs	asymmetrical	1	<->	R, L	L?
				12 or 16 mostly, 1/3 near toe without incs		NA	NA	R, L	L
Jan Diviš ze Žerotína	5:6	indeterminate	1 (2/3 of heel flap height); 4	4; 12 cs near toe without incs	symmetrical	2 (15x)	<->	R	L
Markéta Františka Lobkowitz, née Dietrichstein	3:4 (rarely 4:5)	increased	1 (1/2 of heel flap height); 2						
Václav Vilém Popel Lobkowitz	5:6 (mostly)	indeterminate	1 (2/3 of heel flap height); 4 (rarely 8)	8-16 (irregularly)	asymmetrical	NR (covered)	NR (covered)	R, L	L
Opava	3:4	increased	1 (c. 3/5 of heel flap height); 3	4-6	NA	NA	NA	R, L	L
Znojmo	4:5 or 5:6	increased	1 (2/3 of heel flap height); in one stocking 4 (7x), 20, 12, 8, 16, 12, 8; in the other NA (damaged part), 8, 6, 8 (2x), > 24 cs without dec till toe	12-16, 1/3 near toe without incs	symmetrical	1 (c. 16-20x)	<->	R	L
Brno	NA	increased	2 nearer to ankle; 4 nearer to toe (regularly, but both ends missing)	6-12 (irregularly)	NA	NA	NA	R, NA	L

Table 2b. Shaping of the stockings. Frequency indicates decreases/increases in every *n*th course, number following in brackets gives number of repeats or the length of this section. Decreases in the tip of the heel always occurred in alternate courses, therefore only their number is given. Abbreviations: dec(s) = decrease(s), inc(s) = increase(s), c(s) = course(s), R = right (leaning) decrease/increase, L = left (leaning) decrease/increase, <-> indicates two loops orientated in the opposite direction joined by a single section of yarn (see *Under-heel seam* section)



Owner or location	after cast-on edge (from the top)	along back of leg (between decs)	along back of leg (between incs)	along heel flap selvedge	along instep	along sole	in toe (between decs)	above gusset (clocks)
Emperor Maximilian II	1(?)f, 2r, 1f, ... 1f, 2r	2f, 1w, 2f	NA	2w, 2f	1w, 2f	L: 1w, 1f; R: 1w	2f	no
Tycho Brahe (A+B)	4w	1f, 1w, 1f	1f, 1w, 1f	1ch, 1w, 1f	1w, 1f	1w	3f	no
Emperor Rudolf II (A)	2r, 4f, 2r	1f, 1w, 1f	1f, 1w, 1f	3w, 1f, 1w	3s, 2f	1w	3s	no
Emperor Rudolf II (B)	1r, 4f, 2r, 1?2f, 1c with decorative holes, 1f, 2f				3s, 1f	2w, 1f	3s, 1f, 2w	no
Jan Diviš ze Žerotína	6f, 2r	1f, 1w, 1f	1w, 1f	3w	2w, 2f	2w	NA	no
Markéta Františka Lobkowitz, née Dietrichstein	probably none (rolled edge)	1f, 1w, 1f	1w, 1f	3(?)w	2w, 2f	2w, 1f	5f	no
Václav Vilém Popel Lobkowitz	2(?)r; 2(?)f, 2r	1f, 1w, 1f	1f, 1w, 1f	2w	2w, 2f	2w, 1f	NR	no
Opava	probably none (rolled edge)	2f, 1w, ? (L seen only)	2f, 1w, ? (L seen only)	3w, 1f	2w, 2f	1w, 1f	NA	no
Znojmo	c. 12f, 1r	1w	1w	4w	4w, 2f	2w	4f/4r (4r in each 4th c; 4-5x)	probably floral motive in s
Brno	NA	1f, 1w, 1f	1f, 1w, 1f	4(?)w	1w, 1f	1w, 1f	NA	NA

Table 3: Patterns of face and reverse loops. Abbreviations: dec(s) = decrease(s), inc(s) = increase(s), c = course, ch = chain selvedge, f = face loop(s), r = reverse loop(s), w = single ridge, s = seed pattern, R = right side, L = left side. For the pattern next to cast-on edge, numbers indicate numbers of courses, otherwise numbers of wales. Beside patterns of marker ribs, the number of face loops to nearby dec/inc is also given. No “f” means the patterned area adjoins the shaping, except in the heel flap, where it indicates there are no decreases next to the selvedge (central position of decreases). In asymmetrical patterns along the back of the leg, the sequence follows the visual, not the direction of knitting

picked up in modern handknitted socks, there were more loops in the gussets of these stockings. Either the rate of pick-up was more frequent or the number of loops was increased in the second course of the gusset (see table 2 for details).

Another distinctive feature of all the stockings was the presence of triangular gussets on both sides of the foot, bordered by the selvedge of the heel flap and two marker ribs (in various patterns) running from the ankle and from the under-heel seam to the toe. The marker ribs again served as lines, along which the foot was shaped: by decreases along the gusset/instep border and by increases along the side of the sole.

After all gusset loops were decreased and the lines bordering the gusset met, the toe was shaped along the continuations of these now-united lines, symmetrically on both sides of the foot, but sometimes



Fig. 3: The marker rib and decreases and increases along it in the knee section of the stockings of Markéta Františka Lobkowitz. The photograph is shown according to the orientation of the loops, with the top edge of the stocking at the bottom (Image: V. Otavská, © Regional Museum in Mikulov)

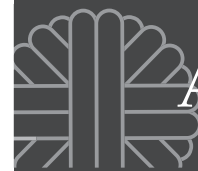


Fig. 4: Two types of toes: Left - symmetrical toe closed by the yarn passed alternately through one sole loop and one instep loop in the stocking of Maxmillian II. Right - asymmetrical toes on Rudolf II's stockings which are closed by the more common method described in the overview section (see below) (Images: S. Odstrčilová, © Prague Castle Administration)

asymmetrically in the vertical direction. When the instep contained a larger number of loops than the sole, the decreases took place in the instep only, until the numbers of loops evened, and only then the decreases continued symmetrically, one in the instep and one in the sole in the same course on each side of the foot (fig. 4b). The toe was then finished by a seam in the horizontal plane. With the exception of Emperor Maxmillian's stockings, where the toe was closed by the yarn passed alternately through one sole loop and one instep loop, it was usually closed by the method described in the section below entitled "Under-heel seam".

The current colour for most of the stockings was given as brown in former publications, but various shades of "archaeological brown" (Ringgaard & Scharff 2010) could be identified. No dye analyses have yet been undertaken.

Even though the provenance was given for three pairs of stockings found in Prague (Bravermanová 1997), it was based on assumptions rather than hard evidence. The provenance is not certain for any of these stockings.

General data for the examined stockings are given in table 1, data on shaping in table 2 and data on patterns of face and reverse loops in table 3. Specific features of individual stockings are described below.

Pair of stockings of Emperor Maxmillian II (1527 to 1576)

Both stockings are missing their heels and the upper back parts of the legs. A form made from woven fabric, which was inserted into them during conservation work and sewn to the original parts of the stockings with closely spaced stitches, makes it impossible to examine the insides and the top edges.

Despite having been described as single ridge (Bravermanová, Koblrová & Samohýlová 1995; Bravermanová 1997), two upper and two bottom courses of reverse loops in the band along the top edge are probably adjacent to each other, and separated from the middle section by a single course of face loops. This middle section contains three more courses of reverse loops, but the existence of face-loop courses between them is uncertain, as the

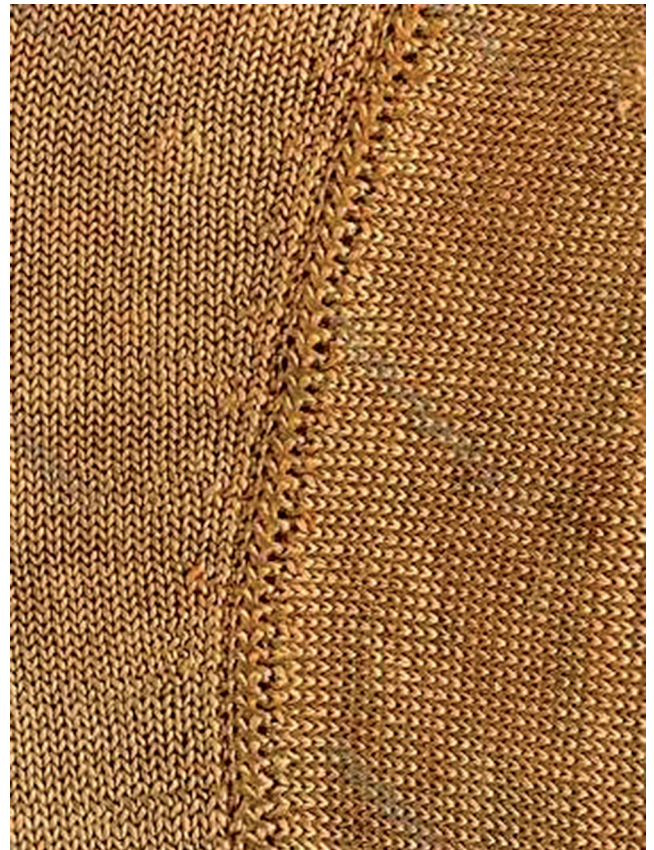


Fig. 5: Unusual picked-up loops for gussets: Left - in the stockings of Maxmillian II (Image: S. Odstrčilová, © Prague Castle Administration). Right - in the stockings of Tycho Brahe (Image: J. Diviš, © City of Prague Museum)

reverse loops are deformed and irregular, implying that the edge might have been lined originally and the sewn stitches deformed the loops.

The sides of the heel flaps look as though the gussets were sewn to them (fig. 5a) instead of worked with picked-up loops, but there are no seams along the other sides of the gussets or across the insteps the presence of which would suggest that the stockings were each sewn together from two parts.

Pair of stockings of Tycho Brahe (1546 to 1601)

The first stocking (A) was recovered from Tycho Brahe's grave in the Church of Our Lady before Týn in Prague, in 1901. After restoration in the 1970s (Vorlová 1974), it was placed under glass, so only the upper proper right recto can be seen currently. The stocking is well preserved, with only a few small holes. The other stocking (B) was taken out from the grave during its re-opening in 2010. Almost the full length of its leg is damaged along the shin.

Stocking A was identified as linen using textile analysis by microscopy, chemistry and the burn test (Pirník

1971). Stocking B was analysed during the conservation work in late 2017 only, when it was identified as silk (Knejřlová 2017). This conservation work provided the opportunity for further examination of the stocking, including the verso.

The most distinctive features in both stockings are parallel sections of yarn running regularly from each ridge across the heel flap selvedge, which is dissimilar to typical picked-up loops for gussets (fig. 5b). In contrast to tightly knitted loops in selvedges seen in other historical stockings, the selvedges in both of Brahe's stockings are formed by larger, looser loops, suggesting the use of the chain selvedge technique (Hemmons Hiatt 2012, 73). The similarity of both heel flap selvedges, which are so distinct from other stockings, clearly shows that stockings A and B belong to the same pair, even though they were recovered from the grave separately (on different dates) and the material analyses disagree. (The analyses were done 50 years apart suggesting that stocking A needs re-examination).

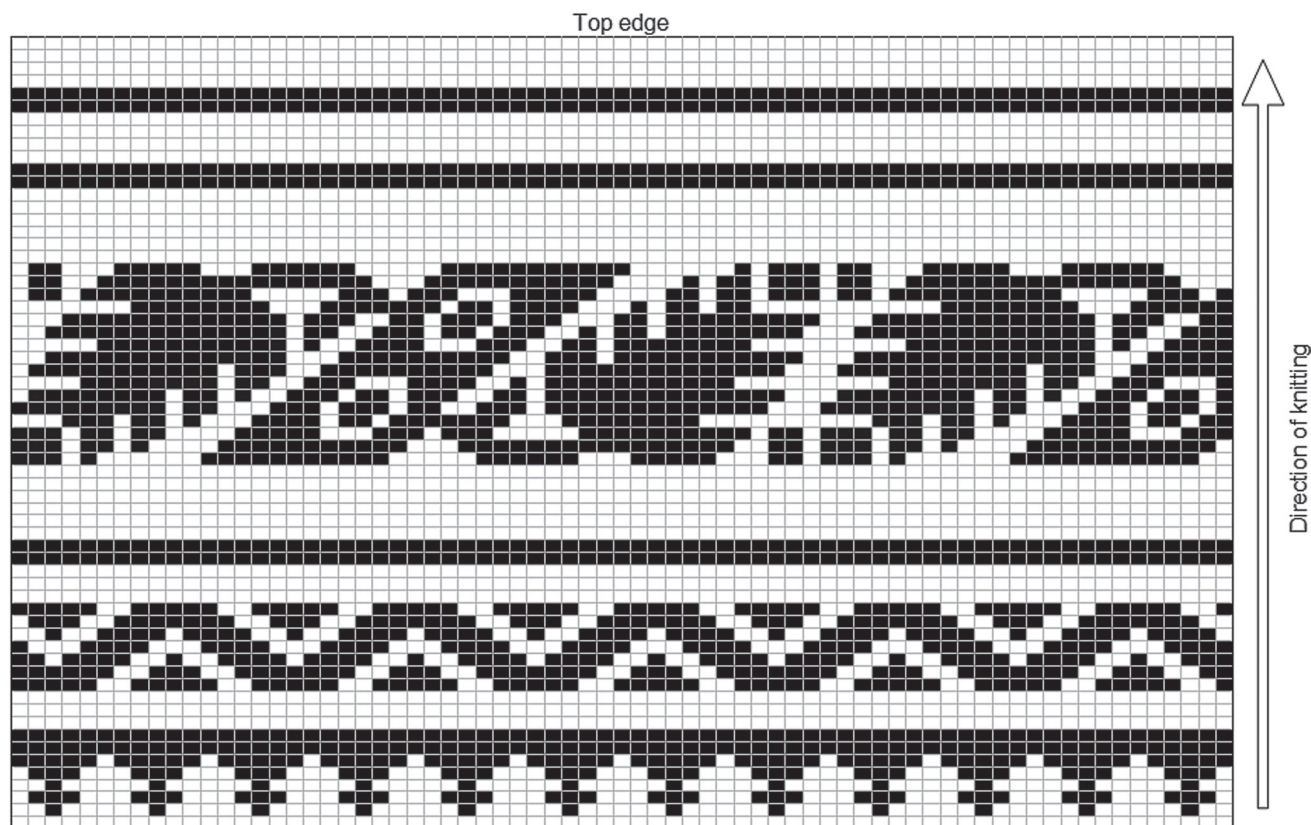


Fig. 6: Schema of the colour pattern in the stockings of Markéta Františka Lobkowitz. White = silk in main colour, black = metallic yarn (Image: S. Odstrčilová)

Pair of knitted stockings of Emperor Rudolf II (1552 to 1612)

Both stockings are well preserved with only minor damage along the top edge and in the foot. The feature described as a sewn seam in earlier publications (Bravermanová & Čierna 1997; Bravermanová 1997) is a wale of reverse loops.

The two stockings differ from each other in their decoration along the top edges and along the sole borders (differently patterned sole borders are partially visible in fig. 4b), but they show striking similarities in other features, such as several increases along the top edges (four in one stocking, fifteen in the other), and the change in the frequency of decreases in the thigh sections. Unlike most of the other stockings, the pattern along the instep/gusset border consists of alternating face and reverse loops in a vertical as well as a horizontal direction - so-called "seed stitch" (Hemmons Hiatt 2012, 180) or "moss stitch" (Stanley 2001, 95).

Stocking of Jan Diviš ze Žerotína (1576 to 1616)

The single stocking is very fragile, with the fabric broken in many places. Therefore, the research was based only on the study of photos taken during conservation work (Otavská 2010). A strip of silk fabric is attached to the top edge. This is probably the remnants of the edge with eyelets for fastening the stockings to the upper hose.

Pair of stockings of Markéta Františka Lobkowitz, née Dietrichstein (1597/1599 to 1617)

This well-preserved pair of stockings still has its original silk sash garters, embellished with metallic bobbin lace (fig. 1).

Two upper sides of the gussets are embroidered with a metallic yarn (made of a strip of what is probably silver wound around silk core) in simple chain stitch (Otavská 2006). Along the top edge, there is an 8.5 cm wide band with geometrical and floral decoration (see chart in fig. 6) knitted in metallic yarn. This top band



was worked in thicker silk yarn than the main part of the stocking, and the loops in it are orientated in the opposite direction to the main part of the stocking.

Pair of stockings of Václav Vilém Popel Lobkowitz (1598 to 1626)

The toes and heels of both stockings are covered with a woven silk fabric, and the sewn stitches running along the length of the foot indicate that there was a sole attached too. The top edge is lined underneath with a strip of woven fabric, and it has eight overcast eyelets, through which silk ribbons were drawn to fasten the stockings to the bottom edge of the hose.

There are many errors (missing reverse loops) in the marker ribs. Moreover, one of the soles is placed asymmetrically, starting with one of its marker ribs in the continuation of the under-heel seam (fig. 7).

Stocking from the Mošovský family crypt in the Dominican monastery in Opava (burial dates from 1599 to 1652)

Due to the fragile state of this stocking, only one side (the proper left) was observed. The bottom part of the foot is partially missing, including the toe. The tip of the heel was shaped along two lines on each side. This is what is today known as a Balbriggan heel (Bush 2011, 58).

A woven fabric was attached to the sole but is no longer there. Its outline is still visible due to differently coloured patches in the knitted fabric and a line of stitch holes.

Fragments of stockings from St Nicholas Church in Znojmo (date unknown)

Both feet and a few leg fragments are preserved. There is a pattern of reverse loops partially visible above the ankle creating what is commonly called a clock.

Marker ribs bordering the gusset start as simple ridge four wales wide, but the reverse loops are gradually thinned out (in each fourth and then in each eighth course only) and the lines do not meet at the toe, because the sole is much narrower than the instep. Besides the usual shaping, there are several decreases in the middle of the gusset.

Fragments of a stocking from St James's Church in Brno (date unknown)

The biggest fragment shows two directions of knitwork, perpendicular to each other, identifying it as a part of the foot of the stocking. Three vertical lines of alternating face and reverse loops (two sole borders and a part of a gusset/instep border) run across the simple knit fabric. Another such line runs across one



Fig. 7: The underside of the stocking of Václav Vilém Popel Lobkowitz showing a course of reverse loops in the heel flap and asymmetrical start of the sole (Image: V. Otavská, © Regional Museum in Mikulov)

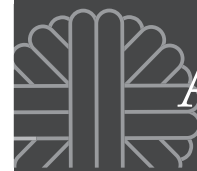
of the smaller fragments, probably a part of the leg. A woven ribbon is attached to the verso of this fragment following this marker rib. A similar strip of woven fabric along the seam at back of the leg was recorded in the stockings of Johann Ludwig II von Sulz, which date to before his death in 1687 (Fingerlin 1992, 191).

Interpretation

Knitting direction

The orientation of the loops shows that all the examined stockings were knitted from top to toe. Only the two-coloured band along the top edge of each of Markéta Františka Lobkowitz's stockings was worked in the opposite direction, probably having been added later, after the stockings were finished.

Despite the previous reported descriptions of seams at the backs of the legs, the only true seams were observed under heels and in toes. However, there may originally have been a short sewn seam securing the small slit at the back and top of Tycho Brahe's stocking B. The selvages on both sides of this slit show that the first four courses in single ridge were knitted back and forth, and then knitting continued round in simple knit. A future re-examination of the top edges of other stockings may produce evidence of other examples of knitting back and forth. The main parts of the stockings were knitted round (except for the heel flaps). This indicates that they were handknitted, because the early knitting frames could not produce tubular fabric (until the end of the 18th century).



Symmetry of decreases and increases

Right-leaning decreases were used in most cases. In the stockings where there are left-leaning decreases too, they were not placed in symmetry with all the right-leaning decreases, but only in the gusset on the proper left side of the stocking, and usually only in its upper part, where the decreases took place in each course. The only stocking with left-leaning decreases running along the whole length of the gusset was the stocking from Opava. As the other side of the leg was not available for examination, it is not yet known whether symmetrical decreases were placed along the back of the leg too. It is likely they were not because the last decreases in the tip of the heel lean to the right on both sides of the stocking.

All the decreases were placed at the same distance from the marker ribs on both sides of the stockings, regardless of their lean direction and position on the left or right side of the marker rib. The same is not true of the increases.

There are two main ways of increasing (each achieved in several ways): 1) adding a loop between two loops of the previous course, and 2) knitting two loops from one. If the direction of knitting is known, these techniques can be distinguished. In the stockings reported here, only the second method was used. Specifically, increases were made by knitting a loop from the previous course, either before or after knitting a loop in the same wale currently on the needle, the so-called “lifted increase” (Interweave Knitting Glossary) or “raised increase” (Hemmons Hiatt 2012, 208-209). However, in many modern knitting instructions, this term refers to knitting the additional loop from the previous course. To locate the exact position of such an increase, it is necessary to determine whether the additional loop was knitted before (right lifted increase) or after (left lifted increase) the loop on the needle. This is difficult to distinguish in very fine knitted fabrics (100 wales per 10 cm or more). Therefore, the term increase in this paper refers to the whole process of knitting two loops from one, and is the opposite of a decrease.

In most of the stockings, the increases were placed at the same distance from the marker rib at the back of the leg or symmetrically on both sides of the foot. The exceptions are the under-knee increases in the stockings of Markéta Františka (fig. 3) and Jan Diviš, and the sole increases in Emperor Maximilian's stockings, which all have an increase immediately next to the marker rib on one side and one face loop between them on the other side. However, these increases are symmetrically spaced one loop from the marker rib, if the increase is understood to be the

additional loop only. This is evidence that “increase” had different meanings for 16th and 17th century knitters than it does for today's knitters and knitwork scholars.

Under-heel seam

The most frequent appearance of the heel (and toe) seams is two loops orientated in opposite directions and joined by a single section of yarn. These connecting yarns are parallel to each other along the length of the seam, showing that the two parts were not grafted or whipstitched. Without seeing the verso, the exact method of joining them could not be determined. However, the inside of Tycho Brahe's stocking B and the verso of the fragment from Brno clearly show the chains of cast-off loops, proving that both parts of the heel were not sewn but knitted together, probably in the same way as was described in the 17th century knitting pattern in *Natura Exenterata* (Rutt 1987, 241). The direction of the chain loops shows that in Tycho Brahe's stocking the heel was closed from the centre to its selvages, but in the fragment from Brno the closure was worked in the opposite direction, from the sides to the centre.

Sometimes, the direction of the under-heel seam can be determined, even though only the recto was observed. The last full course of the heel flap in Václav Vilém Lobkowitz's stockings was knitted in reverse loops (fig. 7), followed by half the course in face loops, which suggests that the under-heel seam was subsequently worked from the centre of the heel to the edge.

Picking up gusset loops

The sides of the heel flaps in three pairs of the stockings (Emperor Maximilian's, Tycho Brahe's and fragments from Znojmo) are unusual compared to the others discussed here and in comparison to socks made by modern methods. They raise the question as to how new loops were picked up for the gussets and the sole. Picking up usually refers to inserting the knitting needle into the loop in the existing knitted fabric and drawing yarn through it to create a new loop on the needle. As a result, both legs of the new loop come out from the same parent loop. However, single yarns cross the heel flap selvages of the stockings in question. This is most conspicuous in Tycho Brahe's stockings (fig. 5b). Each of the parallel yarns there can be interpreted as one leg of the new loop only, or the bar of the reverse loop two wales from the selvedge, which has stretched due to a new loop having been picked up from it. However, if the new loops were picked up from the loops two wales from the edge, the edge of the fabric should be visible in the verso.



	Group 1	Group 2
Shaping of heel flap	lateral (along selvages), only in the tip of heel along the centre	central
Frequency of gusset decreases	1 mostly to 1/2 of heel flap height or less, then 2-4	1 to 2/3 of heel flap height, then 4
Frequency of sole increases	4-8, same interval in one stocking	8 or more, irregular frequency in one stocking
Toe	symmetrical	asymmetrical

Table 4: Characteristics distinguishing two categories of stockings with triangular gussets and shaped soles

The inside of stocking B shows no three-dimensional structure along the selvedge; the gusset continues in the same plane as the heel flap. This should be possible only if the selvedge loops were picked up (which is not the case), or if the yarn in question was not a bar of the existing loop but an independent thread encircling the selvedge (probably whipstitched), and each loop of it was then used as a starting loop for knitting the gussets.

The yarn running across the heel flap selvedge in the stockings from Znojmo looks even more convincingly like an independent thread. It is a little different in colour than the knitted fabric and its path shows a slight irregularity, as if the stocking maker did not care to pass the needle exactly into the centre of each loop, but was whipstitching the edge of fabric.

In the stockings of Maxmillian II, the single yarns across the selvedge alternate with Vs typical of the usual picking up technique. However, in some of the Vs, one of the legs contains more yarn strands than the other, and there is one new gusset loop for each yarn crossing the heel flap selvedge, regardless of whether it starts singly or as half of a V. In contrast to Tycho Brahe's stockings, where one loop from each ridge was picked up and the number of loops increased in the second course of the gusset, in Maxmillian's stockings, the number of new loops was already greater in the first course. This was most likely achieved by passing the yarn twice through some of the heel flap loops. As the yarn in Maxmillian's stockings is combined (consisting of several parallel strands), it was probably difficult to separate the strands belonging to these two sewn stitches, and this led to different thicknesses of yarns being drawn out from the same loop, as mentioned earlier.

The idea that the selvages were whipstitched is also supported by the observation of several yarn ends inside the heel area of the stockings from Znojmo and a knot near the upper tip of the gusset inside Tycho Brahe's stocking B. When the heel is closed from the

centre to the sides and loops for gussets are picked up in the usual way, the whole stocking can be worked with one continuous yarn, but for whipstitching the working yarn must be cut to be threaded on to a sewing needle or another piece of yarn must be used.

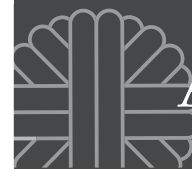
Comparable items

No similar items to the stockings from Znojmo with their partially closed gussets have been located yet. However, there are several examples of stockings with shaped soles and triangular gussets bordered on all three sides. These include the burial stockings of King Johan III of Sweden (Ekstrand 1982, 166-168), Pfalzgraf Philipp Ludwig of Neuburg (Stolleis 1977, 73-74), Duke Barnim X of Pomerania (Rutt 1987, 73; Januszkiewicz 1995, 90-92) and one of his relatives (Januszkiewicz 1995, 124-125), and the stocking foot found in London (Museum of London A13833). The dates of all these stockings coincide with the stockings in the Czech Republic - from the mid-16th century to the mid-17th century.

The foot from London differs from the rest because the toe decreases start before all the gusset loops are decreased. The photograph of one of the stockings from Pomerania (Januszkiewicz 1995, 124-125) is too vague for any conclusions to be drawn. The rest of these stockings show (apart from minor differences in shaping and distribution of reverse loops) distinct similarities to the stockings found in the Czech Republic.

They can be divided into two groups based on the shaping of their heel flaps, gussets and soles (table 4). The first group contains the stockings of Maxmillian II, Tycho Brahe, Markéta Františka Lobkowitz, the stocking from Opava, the stockings of Barnim X of Pomerania and Johan III of Sweden. The other group contains the stockings of Rudolf II, Jan Diviš ze Žerotína, Václav Vilém Lobkowitz and Philipp Ludwig of Neuburg.

It is clear to see how the frequency of gusset decreases



and sole increases influenced the symmetry of the toe. But as there is no reason for the correlation of these features to the shaping of the heel flaps, these two styles may represent different, probably regionally based, knitting traditions. Moreover, there are other stocking types known from the same period in other countries. Further research into the distribution of these various stocking types through Europe may help to determine the provenance of the individual stockings.

Bibliography:

- Bravermanová, M., Kobrlová, J. & Samohýlová A. (1995) Textilie z hrobu Maxmiliána II. z Colinova mauzolea v katedrále sv. Víta na Pražském hradě. *Archaeologia historica* 20, 497-511.
- Bravermanová, M. & Čierna, A. (1997) Pohřební textilie z hrobu Rudolfa II. v královské hrobce v katedrále sv. Víta na Pražském hradě. *Archaeologia historica* 22, 363-384.
- Bravermanová, M. (1997) Pohřební výbava Habsburků pohřbených na Pražském hradě. Pohřební výbava Tycho de Brahe. In: Fučíková E. (ed.): *Rudolf II. a Praha: Katalog vystavených exponátů*, 274-287, 316-317. Praha.
- Bush, N. (2011) *Folk Socks. The History and Techniques of Handknitted Footwear*. Loveland: Interweave Press.
- Ekstrand, G. (1982) Some Early Silk Stockings in Sweden. *Textile History*, 13(2): 165-182.
- Fingerlin, I. (1992) *Die Grafen von Sulz und ihr Begräbnis in Tiengen am Hochrhein*. Stuttgart: Landesdenkmalamt Baden-Württemberg.
- Hemmons Hiatt, J. (2012) *The Principles of Knitting: Methods and Techniques of Hand Knitting*. New York: Simon & Schuster.
- Januszkiewicz, B. (1995) *Klejnoty i stroje książąt Pomorza Zachodniego XVI-XVII wieku w zbiorach Muzeum Narodowego w Szczecinie (Jewels and costumes of the princes of Western Pomerania XVI-XVII century in the National Museum in Szczecin)*. Warsaw: Wydawnictwo Krupski i S-ka.
- Knejřlová, J. (2017): Pohřební textilní výbava z hrobu Tycha Braha v chrámu Panny Marie před Týnem inv. č. 31-105327. Restaurátorská zpráva, II. etapa. (Manuscript deposited in Prague Archbishopric).
- Komendová, A. (2008) Konzervátorská zpráva sv. Mikuláš 1/2008 ze dne 30. 4. 2008, uložena v Jihomor. Muzeu ve Znojmě. (Manuscript deposited in South-Moravian Museum in Znojmo).
- Malcolm-Davies, J., Gilbert, R. & Lervad, S. (2018) Unravelling the confusions: Defining concepts to record archaeological and historical evidence for knitting. *Archaeological Textiles Review*, 60, 10-24.
- Odstrčilová, S. (2017) Several knitted stockings from the 16th and 17th centuries. Poster presented at *NESAT XIII*, in Liberec, Czech Republic, 22-26 May 2017.
- Otavská, V. (2006) Konzervátorská zpráva II k: druhá část souboru funerálních textilií z počátku 17. st., přír. č. RMM: 40/04, položka 10, 11, 13; pro: Regionální muzeum v Mikulově. (Manuscript deposited in Regional Museum in Mikulov).
- Otavská, V. (2009) Konzervátorská zpráva k: soubor funerálních textilií z roku 1625, přír. č. 40/04/22 - 25; pro: Regionální muzeum v Mikulově. (Manuscript deposited in Regional Museum in Mikulov).
- Otavská, V. (2010) Konzervátorská zpráva k: hedvábná pletená punčocha Jana Diviše z Žerotína, př. č. 10/93; pro Muzeum Brněnska. (Manuscript deposited in Museum of Brno Region in Ivančice).
- Pietsch, J. (2008) The Burial Clothes of Margaretha Franziska de Lobkowitz, 1617. *Costume*, 42, 2008: 30-49.
- Pirník, K. (1971) Posouzení fragmentů Tycho Braheho. (Manuscript deposited in the City of Prague Museum).
- Ringgaard, M. & Bruselius Scharff, A. (2010) The Impact of Dyes and Natural Pigmentation of Wool on the Preservation of Archaeological Textiles. In Andersson Strand, E., Gleba, M., Mannering, U., Munkholt, C., and Ringgaard, M. (eds), *North European Symposium for Archaeological Textiles X*, Oxford; Oakville: Oxbow Books, 221-224.
- Rutt, R. (1987) *A history of hand knitting*, London: Batsford.
- Stanley, M. (2001) *The Knitter's Handbook*, Newton Abbot: David and Charles.
- Stolleis, K. (1977) *Die Gewänder aus der Lauinger Fürstengruft*, Munich: Deutscher Kunstverlag.
- Šulcová, V. (2012) Hrobový textil z krypty kostela sv. Jakuba v Brně. Konzervátorská zpráva. Textilně-technologické rozborů nálezů. Národní muzeum. (Manuscript deposited in City Brno Museum).
- Vorlová, M. (1974) Protokol o zjištění stavu pohřebních textilních fragmentů hvězdáře Tycho Brahe. (Manuscript deposited in the City of Prague Museum).

Internet sources:

- Interweave Knitting Glossary: <https://www.interweave.com/interweave-knitting-glossary/> (last accessed 27 November 2017).
- Stocking, inventory number A13833, available at <https://collections.museumoflondon.org.uk/online/object/90604.html> (last accessed 16 January 2018)

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