

Cut and Construction of the Pleatwork Embroidered Shirt

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The study of the undergarments before the 16th century can be a challenge. In general, there are few pictures depicting people in their undergarments, and even fewer extant examples. Documentation for women's undergarments is scarcer than that of the men's. However, it is my opinion that there was little difference between basic fashion and garment construction for men and women through over time, especially in the pleated and embroidered shirts.

Background and History

Historians generally believe that shirts and undershirts prior to the late 1400's are made in some variation of rectangular construction (see Figure 1). The only surviving shirts from this period are men's, though we can assume that the women's were of similar cut. By the late 15th century the shirts were becoming fuller and as time and fashion progressed until the middle of the 16th century where they once again slimmed down, most likely to fit inside much tighter fitting doublets and bodices.

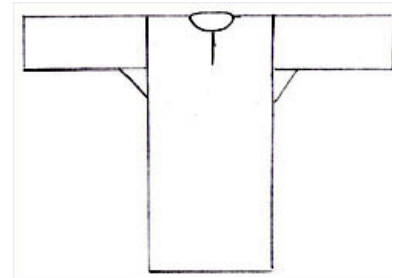


Figure 1: Rectangular shirt construction

Pleat Work

Smocking is usually associated with little girls dresses with embroidered necklines and bodices. Most are done in a style known as English Smocking. Smocking did not originate in England, rather this phrase was coined from its usage through post period in the rural smocks and coats of England and Wales through the 18th and 19th centuries. Modern classifications define smocking as a manipulation of pleating in a decorative fashion.

Pleatwork is a term coined from the period German term 'fitz-arbeit' or "pleat work" (Seidel n.p). Prior to the 17th century, embroidery was for decorative purposes, pleats used to control large amounts of fabric. If you think of pleats as a ground for the embroidery, it takes on a much wider scope of study and it now becomes "pleat work" or "embroidery on pleats". In general, any form of embroidery that was used in period can be translated to being done over pleats or on the pleats.

Sumptuary laws prohibited certain types of embroidery and embellishment, regionally, depending on the social status. They also support the use of pleatwork on garments. In 1493 and again in 1583, in the sumptuary laws in Nuremberg, shirts embroidered with pearls, having pearls "*fastened thereon*" and other embroidery "*pleated or gathered in gold and silver*" were prohibited for all except for the Patrician (Seidel 72-74).

Trim vs. Embroidery

When examining portraiture from the early 16th century the argument is: trim vs. embroidery. It was not mutually exclusive. The Durer self-portraits from the end of the 15th show that trim and embroidery were both used on the same garment (Plate 1). Trim would have been very expensive and as such, it would have been used on just the best garments or only by those who could afford it. Bands of heavy trim, most likely tablet woven and often heavily embellished, were reserved for those of the highest echelon. Embroidery of course was a more inexpensive way to mimic these trims.



Plate 1: Durer Self Portrait 1498

A shirt fragment from the Alpirsbach (Plate 2) monastery has a strip of lace overlaying the pleats. It also verifies the usage of a backing fabric, which would stabilize the pleats and provide a smooth surface against the skin.



Plate 2: Shirt fragments from the Alpirsbach

Late 15th century- Mid 16th century ~ Low Rounded Neckline

Construction

Transitioning from the rectangular construction of the previous undergarments, this next garment features a low, scooped neckline. The shirts represented in the fresco of *The Mass at Bolsena* by Raffaello (Plate 3), are typical of the shirts seen throughout the artwork of this period.



Plate 3: Mass at Bolsena by Raffaello Sanzio



Plate 4: Benedict Cycle at Mt Oliveto by Sodoma

This was a style also reflected in the clothing of the women throughout both Italian and Germanic regions as seen in images from around the 1480's to 1510's. (Plates 4 and 5).

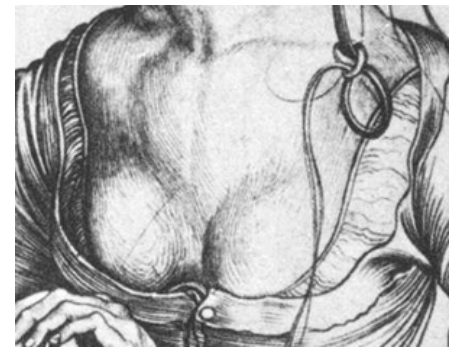


Plate 5: A Foolish Virgin by Schongauer

The construction of these shirts could be done in a number of different ways, each giving a slightly different silhouette. One version is not necessarily exclusive of the other. It is likely that different variations were used depending on the fabric available and the fashion of the region.

Figures 3 and 3a show the shape and layout of one construction style. The wide shirt neckline from the earlier styles is simply gathered / pleated up. The sleeves can be straight or gathered as well. The cuff treatment would also vary from straight to gathered/pleated. This is likely a transition style from the non-pleated to the pleated shirts.



Figure 3

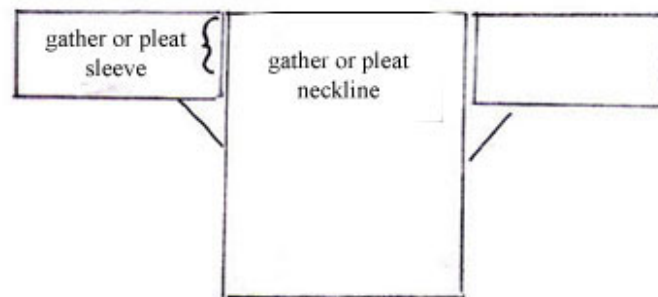


Fig 3a: layout

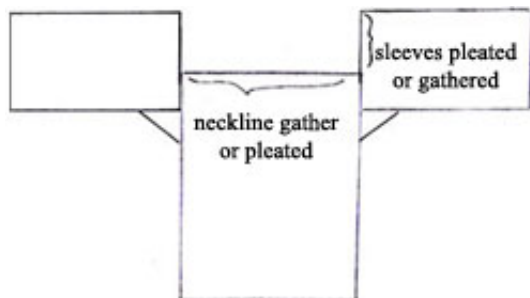


Figure 4

The Durer self-portrait of 1498 (Plate 1) gives some thought to an alternative shirt style based around the widening necklines. The sleeves are raised so that they are no longer even with the shoulder seams. The wide center panels are then pleated up to give the fashionable fullness, the sleeves left straight over the shoulder or gathered / pleated to give the silhouette we see in the fresco image. (see Figure 4).

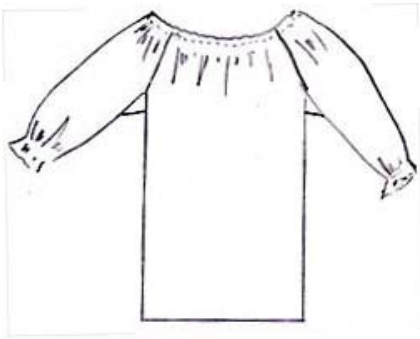


Figure 5

Figure 5 would appear to be more representative of what is seen in the artwork: the gathers are fuller about the neck and shoulders and there are no obvious shoulder seams. This garment would mark the transitional garment to those of the next 30-40 years.

The pattern layout and construction of this garment is open to debate. As with any other type of clothing construction, it is likely that there was more than one way to achieve the desired look.

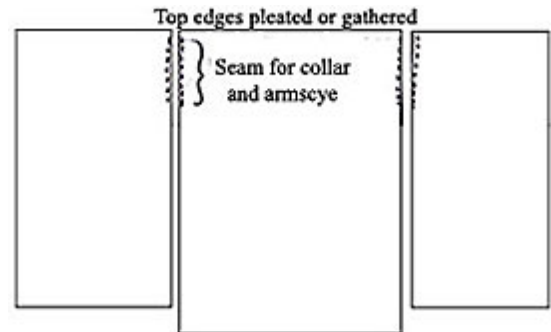


Figure 5a: Layout based on rectangular construction

A plausible layout is one that carries forward into the shirts of the next decades. This layout (Figure 5a) still follows rectangular construction but the sleeves are now parallel to the body when constructing the garment. The entire top edge would then be gathered/pleated up and drawn up into the circle garment portrayed in the artwork. Gussets would be used under the arms to provide ease.

Embroidery

Regardless of the number of variations on the layout and construction of this basic shirt style, the embroidery treatment was just as varied. It is narrow or wide, combined with trim or utilized on its own. In most of these shirts, the embroidery is simple. It serves as a decorative means of controlling the pleats.



Plate 6: Portrait of a Young Man

A simple trellis stitch along the pleating. However, that would not create the small v patterns inside the chevrons.

In the Portrait of a Young Man by Ambrosius Holbein (Plate 6), the actual embroidery on the neckline could be done in a number of ways; the most obvious would be a variation of the honeycomb stitch. This would create the pleat shape shown in the portrait while providing structure. The extra pleating behind and underneath the raised diamond shaped design suggest however that a stitch more related to the modern trellis forming a raised effect, but using more pleats to create the pattern.

The technique used to create the embroidery seen along the neckline of the garment in the portrait of Jakob Meyer, by Holbein the Younger (Plate 7) is less clear. Initially this appears to be done by a



Plate 7: Jakob Meyer

Consider the possibility of pattern darning done through the pleating and the design begins to make more sense. The stitch is not elastic and thus adds structure to the neckline. Another possibility is that the embroidery is a variation of satin stitch worked over the pleats almost in a fretwork like pattern. This type of stitching is found in post-period folk garments throughout the Spanish and Slavic communities. (Keay 27-28.)

There are numerous portraits of women with necklines similar to the men's styles. The variations range from gathered to fully pleated versions. Some feature trim over the pleats/gathers others have full embroidery through the pleats. In fact, most of the portraits from the early 16th show garments that feature some form of gathering or pleating. Most of Raffaello's and Titian's ladies have versions of this low rounded neckline (Plate 8)



Plate 8: Velata by Raffaello

One of the earliest portraits to show obvious pleating is the Portrait of Dorothea Meyer by Hobbelen (Plate 9). Not only is the gathering thread showing in this portrait but the embellishment is laid over the ground of pleats with trim completing the neckline. This portrait is the mate the Jacob Meyer portrait shown above. What is nice about the husband and wife portraits is that it gives us a sense that multiple styles of embroidery and embellishment were concurrently being used.



Plate 9: Dorothea Meyer by Holbein



Plate 10: Madonna by Gossart

Simple styles of embroidery used to hold pleating in place appear in many images from the early 16th century. In a portrait of the Virgin and Child by Gossart (Plate 10) elaborate diamond shapes are seen in the embroidery below the neckline. This could in fact be very fine honeycombed stitches done on very fine fabric.



Plate 11: Veronese Camicia

A causally draped camicia in a painting by Paolo Veronese from the second half of the 16th century is one of the later versions of the rounded neckline (Plate 11). While this garment shows up outside the general period for pleatwork, this garment shows that the shaping and embroidery on the garment continues.



Plate 12: Feast of Herod~ Cranach

The necklines were not the only area embroidery was used to keep pleating in place. This image from the Feast of Herod by Cranach (Plate 12) shows embroidery along the entire bodice area of the undergarment. The function would be to not only to hold the pleats in place but also as a decorative part of the outfit itself. The embellishment of undergarments appears regularly in the Northern European clothing during the 1st quarter of the 16th century.

Higher Rounded necklines - 1510-1530s

Construction

As the first quarter of the 16th century progresses styles begin to change. The neckline becomes slightly higher, closer to the collarbone and the shirt becomes more of a fashion item with embroidery or trim that is more visible. The basic shape will continue to stay the same; the pleating around the neckline from the earlier styles only has to be drawn tighter to raise the actual neckline.

The men's shirts still show no discernible opening though the women's shirt often feature one. This may have been more to facilitate breastfeeding vs. fashion. The neckline edge varies in the different styles. Some appear to be finished to the very edge of the embroidery while the neckline in Pontormo's Portrait of a Lady with Spindles has a tiny ruffled edge (Plate 13).



Plate 13: Lady with Spindles ~ Pontormo



Plate 14: Anthonis van Hilten



Plate 15: Agniete van den Rijne

The embroidery on this style continues to be relatively narrow and simple. Most seem to be tiny honeycombs or simple surface embroidery as seen in the images of Anthonis van Hilten and Agniete van de Rijne by Joos van Cleve (Plates 14 and 15).

This painting of St Cecilia and her Fiancé by Engelbrechtz (Plate 16) painted in 1518 is interesting in that it features a wider band of embroidery on both the male and female figures. This is something that is seen more prevalently a few years later possibly indicating the donors were painted in the latest fashion. Also of interest is the undergarment seen beneath the pleated shirt layer. This would indicate that the shirt would be the fashion layer, a "hemd" (period Germanic term for shirt) vs. a chemise type layer.



Plate 16: St Cecilia and her Fiancé ~ Engelbrechtz 1518

White work tended to be seen on the Germanic portraits, most likely due to their sumptuary laws discussed in the introduction, while in other parts of Europe the embroidery was following the fashion trends.



Plate 17: Lotto

An example of this would be the influence of blackwork and other similar colored embroideries on clothing. The painting by Lotto (Plate 17), the portrait of Charles V by Orley (Plate 18), and Fair Haired Boy by Ambrose Holbein (Plate 19) all show colored embroideries along the necklines.

The embroidery can be done through the pleating using the stitches found in blackwork: backstitch or double running, the pleats replace the threads counted for the patterns.



Plate 18: Charles V by Orley



Plate 19: Boy ~ Holbein

Higher Rounded Neckline: no discernable front opening - 1520s through 1530s

Construction

As the early 1500s progressed, the necklines on many of the shirts began to rise up above the collars as the top layers of the clothing become more voluminous and showy. This style of shirt likely evolved from the earlier styles by drawing the neckline up into a collar (Figure 6). The proposed layout is the same as in Figure 5a.



Plate 20: Gebel

An article in the Livrustkammaren, a Journal of the Royal Armory of Sweden, discussing the evolution of the shirt adds that:

“the sleeves had been drawn up towards the low neck and the slit had been moved to the side of the neck along the seam between the front piece and the sleeve^(Nyeln 275)”

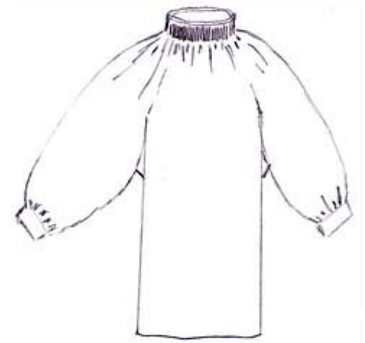


Figure 6

These shirts, as noted above, derive from the earlier, lower cut versions and therefore the construction and layout would be similar. The front and back panels and/or the sleeves would be pleated into one piece and then the embroidery would be done on the pleats or through the pleats. Edge treatment on the shirts varies from a fine ruffle close to the edge, a rounded top edge made by folding over the fabric and pleating it into the neckline or a small finishing band over the raw edges.

The neck closures would follow one of the seam lines at the shoulders, as the shirts would be impossible to pull over the head due to the inelasticity of the embroidery or trim on the pleating.



Plate 21: Phillip von Hessen by Krell

Side openings on the necklines appear much more predominately on male versions of the garment as seen in this portrait of Landgraf Phillip by Hans Krell (Plate 21). Predominate styles for women during this time appear to be the higher neckline versions, which can still be pulled over their heads, or a higher, center neck opening variation.

In the painting of a Girl done by Sarto (Plate 22) the high-necked elaborately embroidered shirt features a clearly shown side opening. It is one of the few portraits found that features a women's garment with the side neck opening. It may be that in many of the images, the openings are just not seen as they are hidden under the necklines of the over-garments.



Plate 22: Girl by Sarto

Embroidery

The embroidery on the shirts of this era is predominately whitework of some form. This may be explained in part by the huge influence of the Hanseatic merchants on the rest of Europe.

Nicolaus Kremer's Portrait of a Nobleman (Plate 23) shows a tightly drawn up neckline with no discernable front opening and is done in a simple honeycombed white work pattern. Other influences continue to show up in the embroidery. Barthel Bruyn the Elder features high neckline in the Portrait of a Lady (Plate 24). The embroidery on both is very likely a version of pattern darning similar to that seen in Holbein's Meyer portrait (Plate 6).

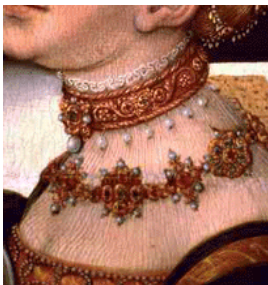


Plate 25: Cranach

With both the male and female version of the garment, it is difficult to discern embroidery vs. trim or a banded collar. In general, the higher the class the more likely it was a band of trim and not embroidery. Cranach's Saxon princess portraits (Plate 25) show numerous examples of pleated high necklines covered by elaborate trims and jeweled bands.

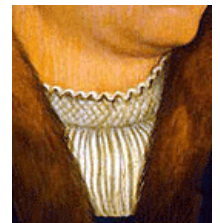


Plate 23: Nobleman



Plate 24: Bruyn

Higher Neck - Full Collar –center opening - 1520s to 1550s



Plate 26: *The Giusti Family of Verona* by Vendri

Construction

Towards the end of the first quarter of the 16th century clothing styles were rapidly evolving. However, for the shirts and other undergarments, the overall silhouette did not vary much. In general it was a variation on a high collar, topped by either a band or a ruff and were predominately center-front opening. Fashion had begun to move the necklines up higher and instead of hiding the finished neck edge it began to evolve as a ruff. With the shirts now a fashion item, not just a functional piece of clothing, more emphasis would be placed on the fabrics and embroidery used on the clothing.

This style was also prevalent in the fashion of the women's clothing. More prevalent in the Germanic states, it begins to carry over into other cultures as the bodice necklines stayed low though it takes on a role of a modesty garment in the guise of a partlet. As with the earlier styles of shirts the actual embroidery and trim used on the garments varied. Much of the variations can be attributed to station and affordability in addition to the changing fashion trends.

The construction would continue to be like the side-opening version. The same four panels are drawn up to the neckline; the only drawback to this style would be the amount of fabric used for the garment. With increasingly finer fabrics available for clothing, the amount needed to pleat up into the neckline of a shirt of the style would also increase.

In *Portrait of a Venetian Gentleman* by Jan van Scorel (Plate 27), you can see the fineness of the pleats and the tiny stitches used in the pattern. The pattern works out to approximately 16 pleats per ¼ in. Making the pleats 1/8 in deep, that would equate to 16 inches of fabric for every inch of pleats. Consider a typical 16-inch neckline, leaving allowance for ease; it would require a neckline edge, un-pleated, of 256 inches or 7 yards. The fabric would have to be extremely fine in order to draw up this much fabric without adding substantial bulk.



Plate 27: *Venetian gentleman*



Plate 28: *Henry VIII* by Holbein

A variation of the original layout reduces the amount of fabric used in the garment. The fabric industry by this point in time is strictly controlled by the guilds and heavily taxed a layout that saves fabric would make sense. A shirt shown on a portrait of Henry VIII by Holbein (Plate 28), has a seam in the shape of a “V” along the top of the shoulder.

A layout as shown in Figure 9a creates a garment with that “V” for a shoulder seam (Figure 9). The front and back are sewn together at the top edge the length. The sleeves are set into the sides of the garment forming a sloped sleeve head as depicted in the Holbein portrait (see figure 9a).

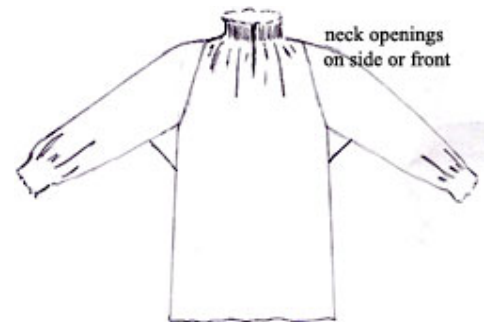


Figure 9

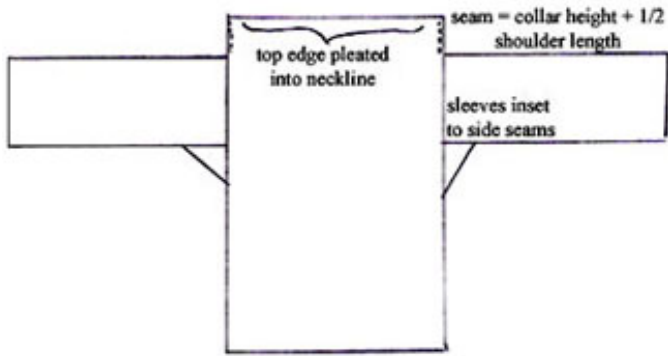


Figure 9a: possible layout



Figure 9b: finished garment

Embroidery

In the Germanic influenced regions, the shirt styles feature variations of elaborate whitework done on or over the pleating. Holbein, paintings and woodcuts from about 1532 to 1536 in both Germany and England and other regions documented this style extensively. Even though there are no extant garments featuring this work on the shirts in existence, there are numerous extant samples of whitework on other items, such as linens, chalice and altar cloths, a style originating back to the 12th century.



Plate 29: Amberger ~ Young Woman



Plate 30: Sofonisba Anguissola



Plate 31: Münster by Amberger



Figure 10: Shirt over a women's dress

Blackwork continues to be seen in this time period in the embroideries. As it becomes more and more popular for fashion it shows up on the necklines of the shirts as in the shirt on the portrait by Holbein of Deitrich Born (Plate32).

Considerable argument can be made that these would be bands embroidered in blackwork, but it is also very possible that the patterns were done on the pleating directly, counting pleats for the pattern instead of threads.



Plate 32: Derich Born by Holbein

Shirts post 1550s

As fashion progressed in much of Europe from the full over-garments to the tighter fitting doublets and jackets, the shirts worn under these garments also changed. The full elaborate shirts were no longer in fashion, as they were not being seen through the outer garments. Necklines and sleeves or cuffs were now the visible parts of the garment and a shift back to the slimmer lines took place. Pleatwork was no longer needed to keep the large amounts of fabric in control.

By the middle of the century, the clothing began to have a separate ruff, thus ending the need for an integral ruff in the shirts. In fact, in 1532, Willibald Pirckheimer had in his clothing inventory:

27 linen ruffs (Kragen) "smocked and unsmocked so a person can place and sew it to a shirt" (Seidel 202-206)

Variations of pleating and stabilizing embroidery continued to be used in the garments but it no longer played a role as a fashionable embellishment. Lace was beginning to have a large influence in fashion and its usage quickly replaced embroidery on the shirts.



Plate 33: Venetian Shirt c 1583

In 1583 a Venetian merchant ship was wrecked off the coast of the island Gnalic (Plate 33). Three shirts were found from this wreck. Close examination of the body of the shirt as it goes into the collar shows very tiny stitches holding the pleating in place. (Flury-Lemberg 328)

The Sture shirt (Plate 34) is one of 4 shirts, two fancy and two without collars, found in a strongbox and dating from 1567. The neckline and the sleeves of the shirt are tightly pleated as they are attached into the collar and the cuffs. The pleating is estimated at approximately 14 pleats/cm (NyeIn 238). A very simple outline or stem stitch holds the pleating in place. (Plate 35).



Plate 34: Sture Shirt

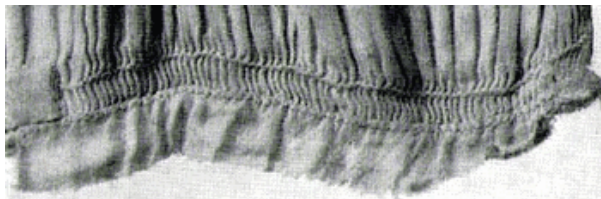


Plate 35: Sture Shirt cuff

Partlets



Plate 36: Lucas Cranach the Elder ~ Christ Blessing the Children

While not a shirt or chemise layer, partlets appear to have evolved from the earlier shirts layers worn by women. The actual construction of the partlets is as varied as the styles. Some clearly would be made in similar fashion to the shirts of the earlier periods, with 2- 4 panels being drawn up into the neckline and the neckline pleated and embroidered.

The pleated partlet layer begins to show up during the mid 1500's as the necklines of the gown continue to stay low. On many of the earlier fashions, especially in the Northern European regions, it is difficult to determine if the undergarment is a shirt or a partlet.

In *Textiler Hausrat*, Dr Zander-Seidel describes an article of clothing that may be what we are seeing in paintings such as Cranach's Christ Blessing the Children (Plate 36):

"a precisely detailed description of a 'Halshemd' has yet to be found. There are found in the clothing indices so many frequent references to materials and accouterments (equipment), that the above described pieces of clothing were undoubtedly visibly worn with the underwear and corset, often including a decorative neck closure which allows its identification as a Halshemd." (Seidel n.p.)



Plate 37: Moroni ~ Portrait of Lady



Plate 38: Portrait of an Unknown Girl



Plate 39: Clouet ~ Catherine de Medici



Plate 40: Titian ~ Eleonora Gonzaga



Plate 41: Clouet ~ Elisabeth of Austria

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How –to-Guide

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It would be wonderful to be able to say. So you want to make this style of shirt with this type of embroidery, so you will need this much fabric. This is difficult because how much fabric you require is dependent on the finished dimensions of the piece, the number of pleats you need for the design (esp. if its counted), the amount of fabric you have to pleat into this finished area, the thickness of the fabric and how narrow the resulting pleats need to be.

When reconstructing period garments this becomes even more difficult to replicate. The fabrics that would have been used for pleated embroidered garments varied by availability and by class. A peasant would not have the same fabric available to them, as would a merchant class or a noble class. Such fabrics as fine silk and linen lawns would have most likely been used for the finely pleated garments such as some of the shirts and chemises. Heavier linens and even wools would have possibly been used for some of the coarser garments.

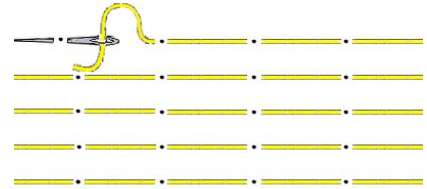
Regardless of fabric type, it is trial and error to figure out how much or how little to pleat up your fabric. To help some of this, put it in perspective of a ratio between fabric width before pleating vs desired width, the number of pleats you need for the design and the desired depth of the pleat.

For example:

45" Wide starting fabric to pleat to 10", this means that you need to have about 4.5" of fabric pleat into 1" when gathered up to the fullness you desire. If in that 1" space you will have a very detailed pattern you will need to place your running stitch to pick up the pleats closer together probably about 1/2" this would give you 9 or 10 pleats/inch with the pleats being about 1/4" deep. If you are doing something with less pleating, along the lines of a deep honeycomb pattern then your running stitches might be an 1" long, giving you 4 pleats or so per inch finished with a 1/2" pleat depth. Again this is all relative to the weight of your fabric and the desired outcome. Experiment !! Make sure your rows are sufficiently close enough together to provide a solid ground for your embroidery. Too far apart and the pleats will move when working on them.

You will see a number of different ways to pleat up the fabric. One way is to do a full running stitch, with the stitches equal distances apart, basically a basting stitch or gathering stitch, very much like you would do cartridge pleating.

The "picking up the dots" method would have you mark out dots or pinpoints equal distance across the fabric. Then the running stitch "picks up the dots". Some people use plastic canvas to mark out the even dots instead of using the conventional dot transfer paper.



Commercial pleaters of course can be used they make very small very fine even pleats. This is good for many of the shirts and chemises. For coarser fabrics or deeper pleats one a pleater will not be usable. The biggest drawback to a pleater is the fixed pleat size.

The horizontal rows are spaced according to the needs of the pattern. They are actually your guide for the embroidery. The bit of material left above the gathering threads are just enough fabric for your stitches to go through in the conventional smocking stitches. NOTE: It is important not to catch your gathering threads in your stitches. This will make it almost impossible to pull the threads out or give the finished work the "float" on the threads for ease.