

## TECHNIQUES OF MAKING RAPIER COMBAT ARMOR

### FROM "I SIMPLY MUST BE ON THE FIELD THIS WEEKEND" TO "I SIMPLY MUST BE ABSOLUTELY DASHING"

by HL Rolanda Rossner



The above statement just about covers the range of styles of rapier armor and rapier fighters. Some of us just need something legal and functional to fight in, and some of us won't step on the field unless we look as if we stepped from a 16<sup>th</sup> century portrait; but we all need armor. Hopefully the information presented here will help you with the process of creating your own armor.

This paper presumes that you have had some sewing and/or costuming experience, but have never tackled rapier armor. The bibliography lists several reference books that will help if you have very little (or no) sewing knowledge, and you can always ask a knowledgeable costumer for help. Making your own rapier armor is horribly intimidating at first glance, but it really doesn't have to be so. If you take it one step at a time, have a plan of action, and ask for help when you need it, your efforts will be well rewarded.

#### STYLES

The two most common styles of rapier armor are the simple T-tunic and the more complicated doublet. The T-tunic is easy to make and is relatively fast to sew; but it is not as stylish, nor does it fit as well as the doublet. The doublet gives a very period look (1500 - 1600) and can be adapted to great variety of styles; however it requires more time and skill to fit and sew. There are many other styles possible, such as a houppelande or a lady's cotehardie. Most garb can be sewn as rapier armor, as long as it meets the protection standards.

#### MATERIALS

Armor can be made of any material that meets the Ansteorran standard of "impenetrable" material. All materials used for the areas of the body, which must be protected by impenetrable armor, must be tested. Materials that normally pass are four-ounce top-grain leather or suede, four layers of "trigger" cloth, or four layers of linen. Other cloth can be used as long as it is tested and approved. The punch test is designed to test for the worse case scenario of a blade breaking and the fighter tripping and a variety of other possible problems. **REMEMBER TO ALWAYS TEST YOUR MATERIAL AFTER WASHING AND BEFORE SEWING!!!!** If you test the finished armor and it fails, what you will have is a court doublet with a hole in it. Make a test piece about a foot square of the finished product (same materials and number of layers), and bring it to your rapier marshal, or a Don or a cadet. They'll do the rest. The test consists of laying the test piece on the ground, and stabbing it hard four times hard in the same spot with a broken blade. Don't be surprised at what they do, and don't feel bad if it fails; better a piece of cloth and some dirt, than a fighter getting injured. There is another method of testing called a drop tester. This is a machine with a weight to punch test the material. Ask your local marshal about the drop tester, as of this writing (July 2000) it is still in the testing phase.

Leather is measured in square feet. Cloth is generally measured by the yard. One layer of a doublet requires about fifteen square feet (or one yard @ 60 inches wide) of finished material (for cloth: wash, shrink, and trim frayed edges); more material is required for full-length sleeves. A T-tunic will require more, up to twenty square feet. A hood generally requires 2 to 3 yards.

Leather armor will be durable and can look very authentic. It flexes more than cloth, and there's only one layer to work with. It may also dissipate the force of a blow, which means the fighter may need to learn to call lighter than he would in cloth. Some fighters that I have talked to claim that it is more comfortable than cloth; some say otherwise. If you think you might want leather armor, see if you can borrow some and try it.

Linen has a wonderful feel and drape. Linen breathes better than cotton because the linen fibers do not expand when wet. Be sure to get 100% linen fabric. The linen cotton blends will have the disadvantages of both fabrics. Linen fiber breaks down in the dryer. Wash and dry linen fabric once. After the garment is made, hang to dry. Linen for armor should have a tight firm weave. If you are going to make your armor from linen, use linen from the skin out. If you combine it with any other fabric, you will stop airflow. See Sources for linen suppliers.

Silk has been used for armor. I have never made any from silk. Most silk blends are too fragile and will not breathe at all. If you want to use silk, you will have to look for a very sturdy weave.

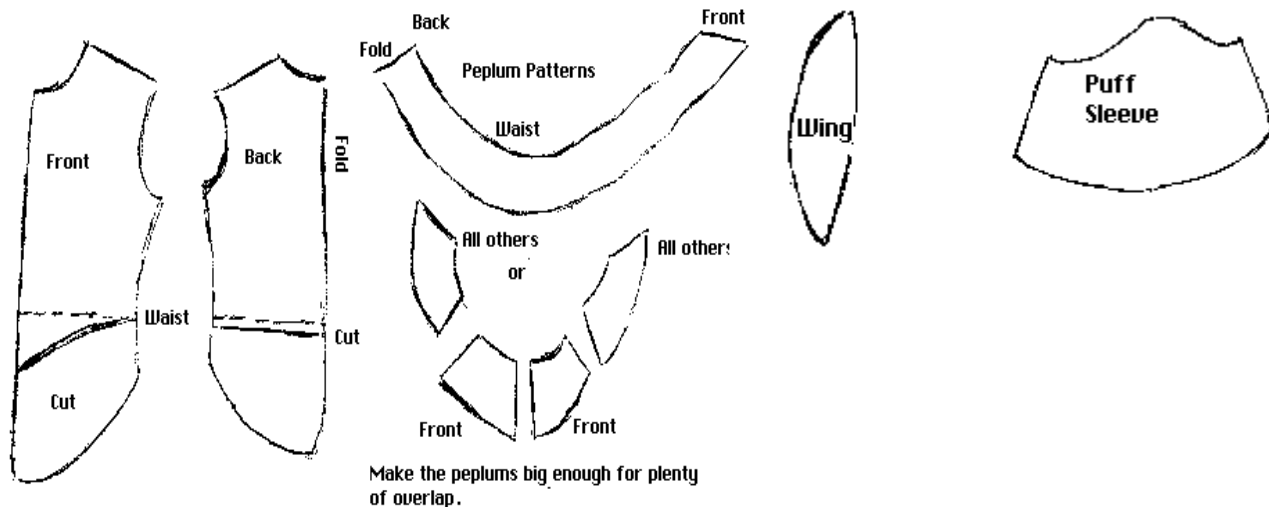
Trigger (or Outtrigger, as it is sometimes called) is available in a wide variety of colors, can be easily washed, uses standard sewing techniques, and it doesn't fight tailoring (much). It's easier to work than leather, but will take more time overall, because you have so many layers to build. **An important note: Some older fighters tend to use the term "Trigger" when discussing approved cloth types. However, most of the cloth on the market today that is called Trigger is not heavy enough for four layers of it to pass the blade test.** The cloth you use for your armor should be moderately heavy and tightly woven. Good materials to look for are a heavy cotton or poly/cotton, "bottom-weight sportswear", and twill. Twill has a square weave on one side and a diagonal weave on the other. Most can often be found on the bargain table (\$2.00 to \$4.00 per yard). If you are inexperienced with armor making, and find a likely-looking fabric, buy 1/2 yard of it, take it home, wash it, test it. Then (if it passes the tests) go back and buy six or more yards of it. Be wary of materials with "sizing" (starch) in them. Sizing will make the fabric look and feel heavier and better woven than it actually is. Sizing will wash out, so wash it before testing. When washing the fabric, be sure to wash it as the fighter will wash it. If you wash a woven, cotton fabric in hot water and dry it hot, this will shrink the material, but also tighten up the weave and make it stronger. The finished armor must be durable enough to handle a trip through the hot dryer; so do this to the fabric before you cut into it. Trigger armor has four times the seams of leather armor, and four (or more) layers of it might cause your sewing machine to have fits; sometimes the needle just won't make it through all of the layers. If this happens, there is a product on the market called Sewer's Aid™. This is a lubricant which, when applied to the needle and top thread, will do wonders for sewing heavy material.

Other combinations of types of fabrics or number of layers of fabric can be used as long as the combination of layers passed the punch test. You can use many different fabrics for the top layer, such as corduroy, upholstery fabric, velvet, cotton velveteen, or just about anything else that will look good on the field. This gives you a wider variety of colors and textures. (Avoid rubber-backed fabrics, and be wary of anything black -- you'll look terribly dashing, but you'll be facing heat exhaustion.) You should be aware of some things when working with alternate fabrics. Fighters are hard on armor; be sure the fabric will stand up to hits, snags, sweat, grass, water, mud, etc. Threads in brocades can come loose, a hit can mar many fabric finishes, and the top threads in trim can easily get caught on tips. If your fighter really likes a light or loosely woven fabric, you can still use it as a top layer. It just won't count as a protection layer and the armor won't be as durable. **REMEMBER TO ALWAYS TEST YOUR MATERIAL AFTER WASHING AND BEFORE SEWING!!!!** If you test the finished armor and it fails, what you will have is a court doublet with a hole in it. Make a test piece about a foot square of the finished product (same materials and number of layers), and bring it to your rapier marshal, or a Don or a cadet. They'll do the rest. The test consists of laying the test piece on the ground, and stabbing it hard four times hard in the same spot with a broken blade. By the current rules, the armor will fail if more than the top layer is penetrated. Don't be surprised at what they do, and don't feel bad if it fails; better a piece of cloth and some dirt, than a fighter getting injured.

A modern Olympic white fencing jacket can be used as armor. Test it to see if it meets our requirements: some jackets will, most do not. Most jackets will fail in the back. The front will generally pass, but the back will not. It will look nicer with a cloth layer over it to disguise the fact that it's a fencing jacket. If the jacket does not meet standards, use a top layer (or several layers) to make it resistant enough.

## **DESIGN**

The first step is to decide the style and fabric of your armor. Look at as many costuming books, rapier armor papers and suits of rapier armor as you can. Discuss with other fighters the good and bad points of their armor. Most of us will be glad to talk about our armor, so don't "reinvent the wheel." Most of the experienced fighters either have Rapier Academy papers you can look at, or can send you to someone who does have them. Make a drawing of your idea and make notes of anything special that you want to do. Read and understand the rules, so your armor will meet the safety standards. This paper was written under Ansteorran standards. If you are in a different kingdom, check with a local marshal for your kingdom standards. Your armor doesn't have to be a doublet or T-tunic, as long as the design meets the protection standards. Pay special attention to underarm and neck protection.



If you have little to no sewing experience and you really want armor and you can't talk your local costumer into making it for you. YOU can make rapier armor yourself. I would recommend the T-tunic design. *Costuming to a T* will talk you through the sewing techniques and *Trigger Armor* (or this paper) will give you the patterns for T-tunic armor and a hood.

If you don't have a doublet pattern, you need a "mockup". A mockup is the "first draft" of your armor. This is the shell that you pin up for fitting, and to which you make all alterations. A good starting point for the muslin mockup is a commercially, non-yoked shirt pattern. When creating your mockup for your collar, sleeves, and peplum fold your material in half, draw your curve, and then cut your pattern piece. Most of us can eyeball half of the curve, but making the other half match is almost impossible. The finished mockup is used as the pattern to cut the armor material. The best fabric to use for your mockup is gingham because of the pattern, which will make it easier to fit. However, most costumers use muslin or almost any fabric on the \$1/yard or under table.

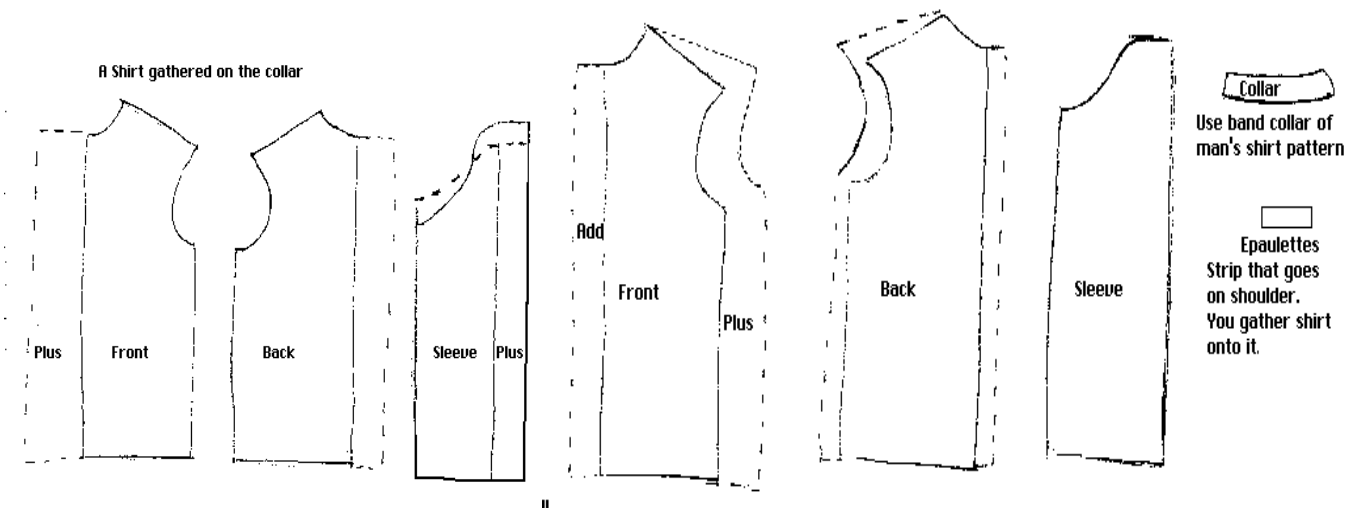
**The mockup must be fitted to the fighter over the shirt and hood he will be wearing, so you can check:**

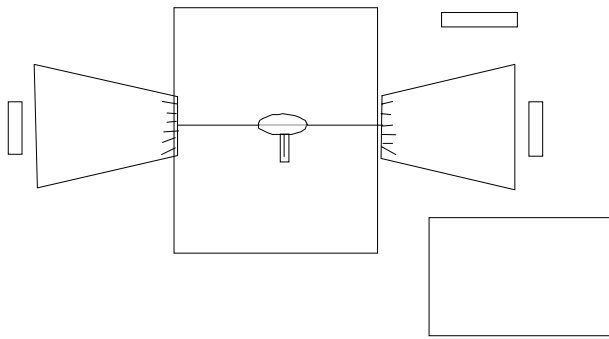
- **Movement** in the shoulders, (can he extend and block without the mockup binding?),
- **Fit** in the armhole (with the seam allowances turned back, is it tight enough to prevent a blade slipping in?), and
- **Length** (does it ride up above the waistline in any of the fighter's movements: extensions, lunges, overhead thrusts or blocks, etc.?).

The fighter's shirt must also be checked for:

- **Comfort** in the armholes,
- **Room** in the shoulders, and
- **Arm Length** (the cuffs must not ride up to expose the wrist when the arm is fully extended!).

A shirt pattern can be made from the same non-yoked shirt pattern that you used to make the doublet (Fig 6, Collar-gathered shirt; Fig 7, Shoulder-gathered shirt; Fig 8, Period-style rectangle shirt)

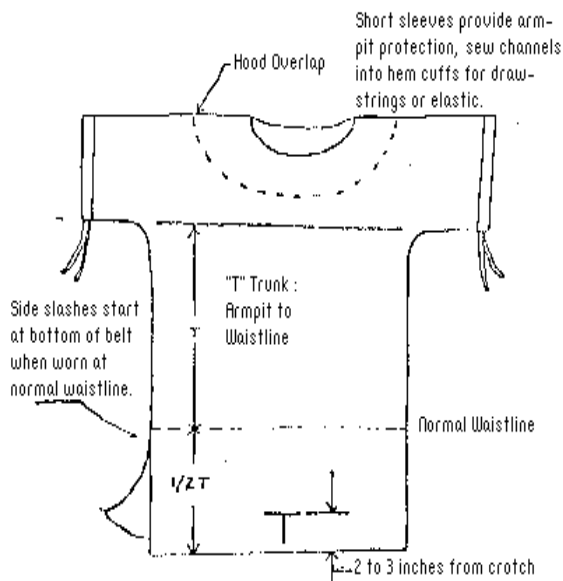
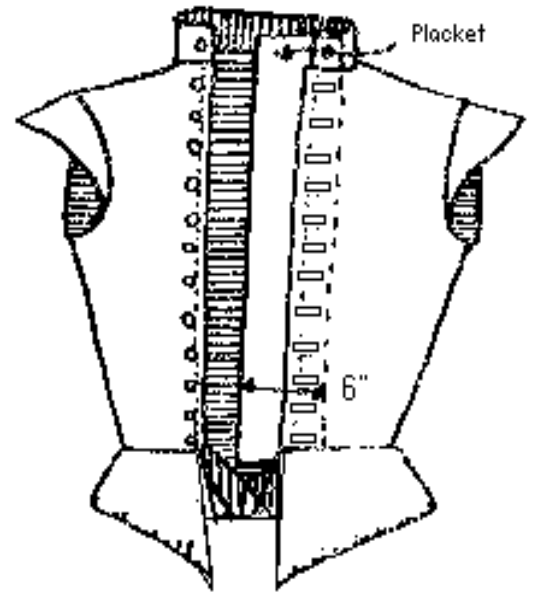
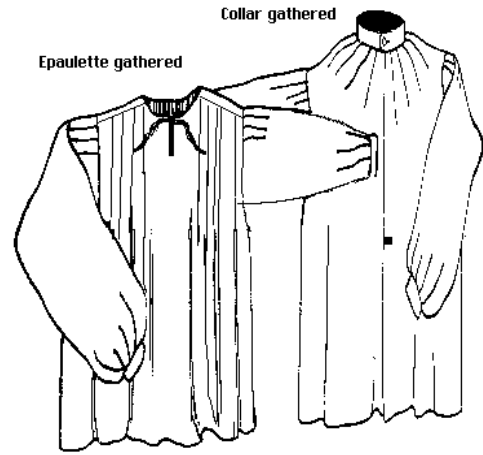
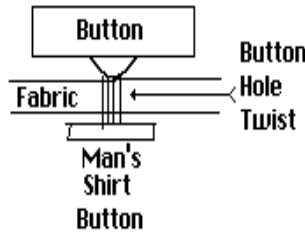




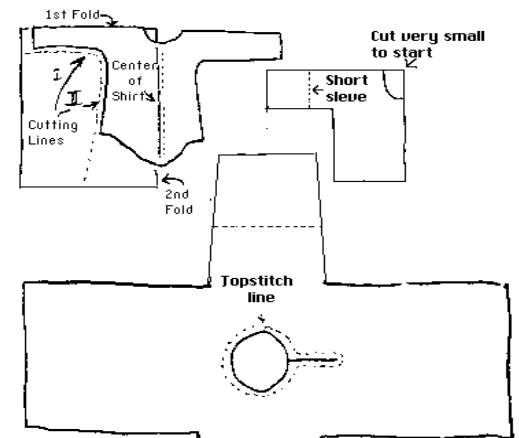
When speaking of cloth are usually made of many layers standard for impenetrable material. However, the layers can be combined in many ways: four layers in the doublet and a light material for the shirt, three (doublet)-and-one (shirt), or two-and-two, or one layer in the doublet and three layers in the shirt (this option lends itself to a variety of styles by allowing many different top layers). You can also make the doublet reversible for a different look.

The armpit must also be protected by impenetrable material. This protection can be accomplished in several ways. The doublet can have puff sleeves or a full sewn-in sleeve (these will be hotter than the other methods); the armhole can come up to cover the armpit; or the shirt sleeve can have a three or four layer insert over the armpit area.

The doublet can be closed by lacing, buttons, buttons with a placket or flap behind the buttonhole side (see Figure 10 for a drawing of this "blade-trap"), or an offset zipper with Velcro or snaps or buttons holding the flap closed over the zipper. The closure should open away from the fighter's dominant hand, i.e., if the fighter is right-handed, the buttonholes should be on the right side. The blade tip should slide over the opening rather than being caught in it. If you use buttons, sew them on with heavy twist button thread and back it with a man's flat shirt button (Fig. 11).



The T-tunic should be fitted to the fighter and checked for the same things as the doublet. The methods for armpit protection are the same. Probably the easiest way to get a T-tunic pattern is by using a comfortable long-sleeved shirt as a pattern (Fig. 12). The T-tunic can be closed by lacing in the back, or buttons on the shoulder opposite the dominant hand (if the fighter is right-handed, put the closure on the left side or with the closure overlapping to the back), or it can be loose enough to just slide over the head. Beware of this loose design, as the extra fabric can easily catch blades. Whatever closure you use (on any of the styles), you should not be able to easily slide a finger through the closure and touch a un- or under-armored area.



Be aware that the more complex the closure, the longer it will take the fighter to undo it to cool off. Twenty-button or laced doublets are period, but take longer to get into and out of than some of the non-period fastenings. If your fighter is heat sensitive, be very aware of this.

The hood should be long enough to cover any gaps in the front, and **must** come up far enough to cover the entire chin area. Remember that in the hood, as well as in the torso armor design, you should not be able to easily touch any un- or under-armored area. This is **especially** important at the neck and chin area. Refer to the rules. The hood should not bulk around the neck area. A hood pattern is included on the back page.

You will also need lower torso protection. Sweat pants work very well. You can also use the sweat pants as a pattern for pants that match your doublet. Lay them out on the cloth and add about 2 to 3 inches all the way around. Sew. Put elastic or a drawstring in a wide waistband and you're done. The things to remember about pants are:

- They must be durable.
- They must have a wide enough waistband to give you extra coverage when you bend and the bottom of the doublet rides up.
- They must be comfortable
- They provide groin protection. Men must still wear a cup.

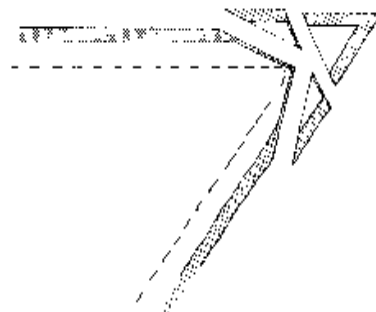
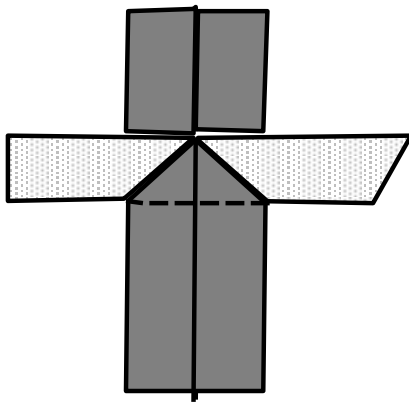
You can also use a man's pant pattern or an old pair of pants. Just rip out the seams, so they lay flat. Add about 2 inches on to the sides. Make them a bit loose and baggy so you can move easily in them, and then gather it onto a waistband. If you desire, cut them off about 2 to 3 inches below the knee and gather each leg onto a band for canions.

### METHODS

Okay; let's proceed step-by-step. Lay out your mockup, measure the amount of material you will need, and multiply that amount by the number of layers required (one layer of the doublet takes one yard, as an estimate). The results of the punch test will give the number of layers required. One yard of trigger (at 60 inches wide) is fifteen square feet of cloth. Remember that if the material is 45 inches wide, you'll need more yardage. When working with trigger (or any cloth, for that matter) be sure to prewash and dry it to get rid of sizing and to allow it to shrink. Remember, ***TEST THE MATERIAL FOR BROKEN BLADE RESISTANCE BEFORE CUTTING, BUT AFTER WASHING.*** Don't wait until you have finished the armor to find out that it will not pass.

The best needle for trigger is a heavy-duty (110) or denim needle with a universal or ballpoint. *Use good quality thread.* Build each layer separately, and then put them together. You must reinforce the stress points, such as the underarm seam and anywhere else that the mockup showed stress. If your machine will do an elastic stitch (which looks like three lines of sewing together), it is an excellent reinforcing stitch. If it won't, double or triple stitch the stress areas. Sew slowly when working with four or more layers. If you try to sew like Speedy Gonzales, the fabric will shift and the needle will snap. This is very hard on your machine and could damage your fabric (with a hole left by the broken needle). Put any trim or decoration on the top layer before stitching it to any other layers. You can decrease the bulk in the seam areas by "beveling" the seam edges, that is each seam edge will be about 1/8" shorter than the one underneath it. Hold the scissors parallel or at a 45-degree angle to the fabric as you cut, so that one edge is cut shorter than the other is.

Here is a tailoring method for reducing seam bulk at corners. It involves clipping corners of the seam. First, sew your primary seams together. Press open with an iron, then sew those two (two-piece) pieces together, and clip triangles out as shown. The other figure shows reducing bulk at a sharp corner, like the point of a peplum. If you use these methods, be sure and topstitch carefully with a small (large number of stitches to the inch) stitch.



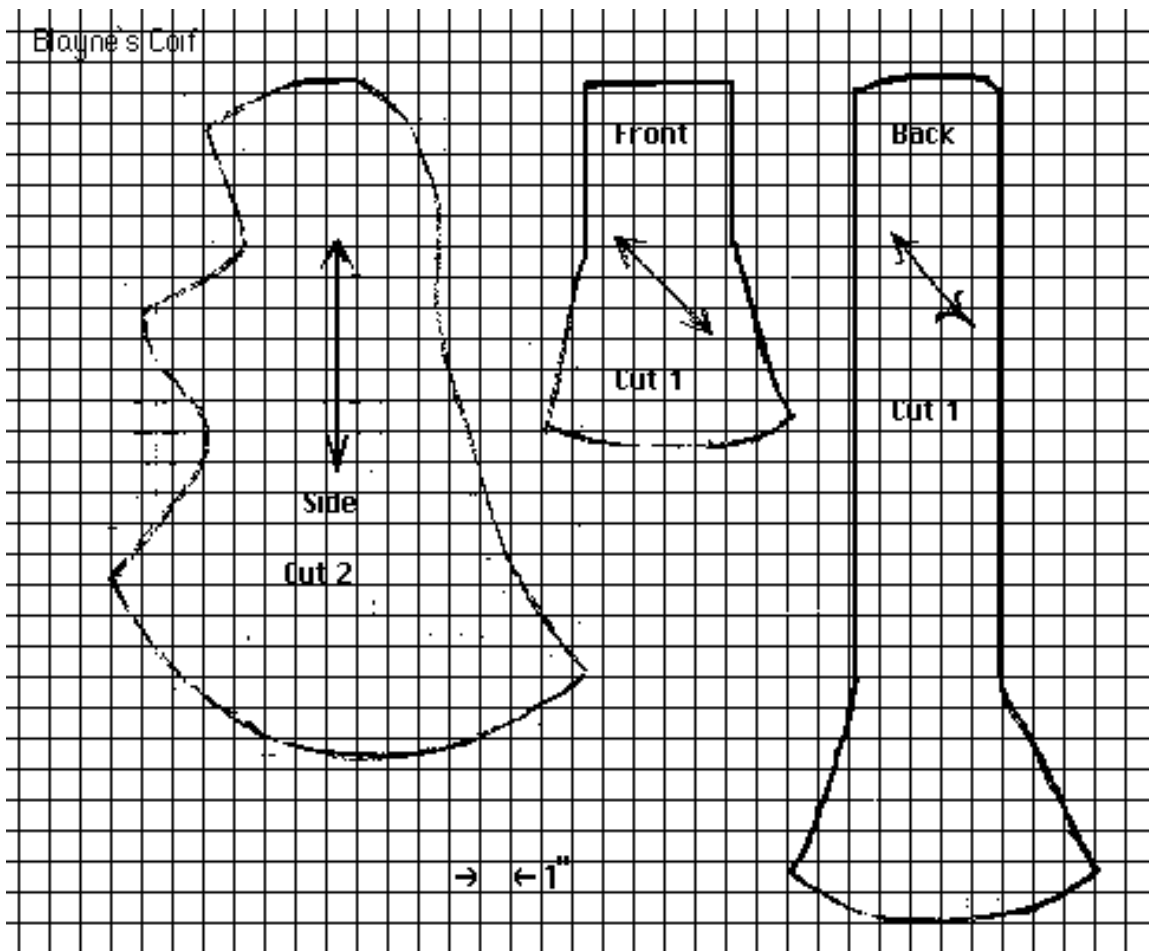
### NEAT TIPS

"Taut" sewing is a method of sewing any number (within reason) of layers and weights of fabric without adjusting your machine. Pull equally on the fabric both in front of and behind the needle. Don't try to stretch or pull the fabric through the machine, just hold it taut and allow the fabric to feed through on its own. This method takes practice and patience.

When you have to sew across several thicknesses of material, a cloth wedge to start the seam is a great help. This is simply a small piece of cloth with several layers sewn together. Put it at the edge of the cloth, sew over it and when you get to the edge of your material, backstitch, as you would normally do. After you are done with the seam, cut the wedge off, so you can reuse it.

Fray-Check™ on buttonholes will keep them from raveling under stress. Run a line of Fray-Check™ in the buttonhole before you cut it, allow it to dry, then cut open. Fray-Check™ can also be used on the edge of the collar on the inside where it joins to the doublet or shirt. This seam tends to give for some people.

If the material is fighting you and nothing is going right, take a break. Stop, pull it out of the machine, throw it in a corner and go do something FUN. Come back to it when you are fresh; this is much better than ripping out a four- or eight-layer seam. (Believe me, even the best seamstresses or tailors have bad days!) Then when you're done, you'll have something to be proud of.



The scale is approximately 1 inch per square. A seam allowance of 5/8 inch is included. Cut 2 sides, 1 front and 1 back per layer. Cut the front and back on the bias (diagonally) to allow some stretch.

A rapier combat coif must impenetrable. The pattern is for a medium sized head, about size 7 1/4. Each layer requires about one yard of 45 inch wide cloth.

Make a mock-up of scrap fabric to try on for size.

## BIBLIOGRAPHY

Most of the references are SCA published or available through your local library.

### **Papers (SCA)**

- Costuming to a T* Mistress Angelica Nicollette Compleat Anachronist #14  
(Good for t-tunic construction and general sewing techniques. It also has a good renaissance shirt pattern. She takes you step by step through the sewing.)
- A Different Doublet* Lady Kyra Hartsong  
(Good doublet pattern.)
- The Pleasure Book* Raymond's Quiet Press  
(Good T-tunic pattern)
- Patterns & Ideas for Ansteorran Duello Armour* Doña Gwenllian Gwalch-Gaeaf  
(Don't make armor without it. One of the more complete papers.)
- Rapier Armor* Doña Rowazna Azquau (Outlands) *The New SCA Fighters Handbook* pp.110-118.  
(Good overview of rapier armor and good patterns.)
- Trigger Armor* Don Alaric Graythorn of Glen More  
(Different styles of armor illustrated; a good hood and t-tunic pattern)
- Two Renaissance Shirt* Robert Santon von Pays-Bas Tournaments Illuminated #59, pp. 23-25  
(good shirt pattern)

### **Books**

- Janet Arnold. *A Handbook of Costume*. Macmillian, London, 1973.  
Good research book, good lists of reference books.
- \_\_\_\_\_. *Patterns of Fashion c1560-1620*. Macmillian, London, 1985.  
Pictures and patterns for period doublets. Definitive work.
- Bryan Holme. *Princely Feasts and Festivals*. Thames and Hudson Ltd. London, 1988. Color reproductions of period paintings. Outdoor scenes.
- Rosemary Ingham and Liz Covey. *The Costume Technician's Handbook* Hienemann Educational Books, Inc. Portsmouth, NH. 1992.  
Theater costuming. Wonderful techniques and great hints on how to make accessories such as high-topped boots.
- Judy Lawrence and Clotilde. *Sew Smart*. IBC publishing, Ft. Lauderdale, FL. 1982.  
Tailoring techniques and sewing shortcuts.
- Blanche Payne. *History of Costume*. Harper & Row, New York, 1965.  
Good overview, some primary sources, patterns taken from period garments.
- Patricia Perry. *Vogue Sewing*. Butterick Fashion, 1982.  
Overview of sewing techniques. You need at least one book of this type.
- Phyllis Schwebke. *How to Tailor*. The Bruce Publishing Company.
- Janet Winter and Carolyn Savoy. *Elizabethan Costuming For the Years 1550-1580*. Other Times Publications, Oakland, CA.  
Sewing techniques, patterns, and good overview. One of the most useful books to have when you are designing and constructing armor.

### **Pictures :**

Left(1): Don Alaric in the original T-tunic armor redrawn from *Trigger Armor*  
Right(2): Gentleman redrawn from Brussels tapestry of nautical games at the court of Henri the III. Holme p. 33.  
Gentleman wears brown doublet with gold slashes and gold brown cape. The pants are pink with either blue slashing or blue ribbons.

- Fig. 3 Drawing after Winter and Savoy.  
Fig. 4 same.  
Fig. 5 same.  
Fig. 6 same.  
Fig. 7 After shirt in author's collection.  
Fig. 8 After Nicollette and von Pays-Bas.  
Fig. 9 Winter and Savoy.  
Fig. 10 same.  
Fig. 11 Author.  
Fig. 12 After *The Pleasure Book* and Nicollette.  
Fig. 13 Redrawn from *Trigger Armor*.

- Fig. 14 same.  
Fig. 15 Drawing after Lawrence.  
Fig. 16 after *Vouge Sewing*.  
Fig. 17 same.  
Fig. 18 Hood pattern by Don Blayne Attewood the Juggler. 1986.

My apologies for the quality of some of the illustrations. Please look at other papers and lots of books. Do you know how hard it is to find a commercial artist at one in the morning the night before your deadline?

**Sources:**

**Linen:** Judy's linen from Silk road fabrics 3910 N. Lamar Blvd. Austin, Texas, USA 78756 Tel: +1 512 302 0844  
<http://www.srfabrics.com>  
Judy's Linen from Aelfwyn's Attic SCA member's discount (10%).  
<http://jodimc.home.texas.net/supplies.html>

My most heart-felt thanks to HL Larkin O'Kane for the use of his computer, his patience with these graphics, and his pains with them; to Don Alden for his usual complete support and his ever helpful comments; and to Don Robin and Mistress Adelia for their cheerful editing.