

STEEL WOOL

Chain mail, forged with knitting needles

BY ELIZABETH COBBE

AS SHAKESPEARE'S *Macbeth* draws to a close, actors in chain mail heave broadswords at one another in a battle for succession to the Scottish throne. Macbeth taunts his adversary: "Before my body I throw my warlike shield. Lay on, Macduff, and damn'd be he that first cries, 'Hold, enough!'"

Pretty tough talk for a couple guys in sweaters.

Though it may look heavy and fierce from the mezzanine, costume chain mail is in fact one of the most common examples of hand-knitting in contemporary stage costume design. That's right: the shiny metallic stuff protecting those actors during their stage fights is really just one big glorified sweater that is relatively easy to make from scratch.

This isn't to say that you can't make chain mail out of real metal. It's possible to construct actual chain mail from aluminum or steel links; there are some metalworkers who still practice the craft, for jewelry (earrings, for example, or pieces made up of miniature interlocking metal loops) or for costume garments worn

at a Renaissance fair. However, metal chain mail is expensive and difficult for costume shops to build, especially if there are multiple actors to dress. Metal chain mail may rust, and the weight is hard on an actor who must wear the costume for hours at a time. An actor wearing metal chain mail can hurt himself if he falls on his knees or an elbow, even with padding under the metal links.

For all of those reasons, the idea to use knitted fabric for chain mail came as a welcome innovation. It's difficult to pinpoint when it happened because of the way costume techniques have historically been passed down from person to person, rather than through formal textbook learning. Lucy Barton makes mention of a rudimentary technique for knitted chain mail in *Historic Costume for the Stage* (1935), right next to the idea that you can use iron pot-scrappers sewn onto a tunic. (Fortunately, the pot-scrappers option has passed from common use.)

Various knitting designs became common by the middle to late twentieth century. Materials for knitted mail

in the past have included cotton or jute cord, rayon ribbon, shoe cording, and rug yarn, each of which has its own drawbacks. Some lack durability; others feel too rough if worn next to the skin or fail to take painting or dyeing well. Through trial and error, designers have discovered a few standard, reliable ways to build chain mail.

The method of creating costume chain mail used most often today originated in the early 1990s at the Utah Shakespearean Festival. Jeffrey Lieder, festival costume director and a professor of theatre at the University of Wisconsin-Milwaukee, developed the method in collaboration with knitters and costume designers.

The costume shop employs a white nylon cord commonly used to make fishing nets. First, the costumers wrap the cord into loose bundles called skeins (similar to how a stagehand bundles long extension cords.) These skeins are dyed black and rolled into balls. Then the shop's knitters—in the past, a group of volunteers that has included Lieder's mother—hand-knit flat pieces to be assembled into garments. A hand-knit sweater is worked from side to side in one continuous thread. When the knitter runs out of thread (or, in this case, cord) and has to start a new ball, the ends of the old thread and the new thread have to be tucked in so they don't show. The cord used in Lieder's costume shop is especially slick, so the costumers go over the places where one thread ends and another begins with a sewing machine. Sewing or knotting these ends prevents *Macbeth's* chain mail from unraveling in the heat of battle.

"Knitters who are not as adept, we have to warn them to keep tension on the cord," says Lieder.

The knit fabric is then treated with a textile adhesive, and Mylar foil is heat-set on the surfaces. One variation on this method calls for the fabric to be coated with a metallic paint instead, a good option for a low-budget shop. Once cool, the pieces are then seamed together into garments. The garment can be sewn to a spandex

Helpful resources for constructing chain mail

Historic Costume for the Stage, by Lucy Barton (1935). With new material added, Boston: Walter H. Baker Company (1961).

www.knitmap.com, curated by Matt King and Stacy McDowell. This website provides a directory of yarn stores in cities worldwide.

Theatre Design & Technology, Summer 2003: 25-29, "Chain Mail Techniques from the Utah Shakespearean Festival" by Jeffrey Lieder, with knitting patterns

by Martha A. Marking. Detailed patterns for the construction of knitted chain mail garments are included. Updated patterns were published in the January 2010 issue of *Piecework*. (Available for purchase at www.interweave.com/magazines.)

Theatre Crafts Magazine, November/December 1981: 24, 36-38, "Knitting Chain Mail" by Dorothy Marshall and Deborah Levin. This article details the earlier trial-and-error process of



looking for materials appropriate for use with costume chain mail.

—E.C.

base which improves fit and helps the garment keep its shape over the course of many performances.

Brand-new chain mail has a metallic sheen that fades over time, but some designers prefer a more aged look. In these cases the shop applies a brown or bronze fabric paint to dull the surface. Ultimately, the garment is worn inside-out with the bumpy side, or purl side, showing to give the appearance of chain mail.

"It's not authentic, it's not real chain mail," says Lieder. "Purists wouldn't stand for it, but it suits our purposes perfectly."

Refining this process has not been easy. Once, Lieder's shop ordered black nylon cord, hoping to skip the dyeing process. The black cord was in fact coated with tar to help maintain the knots in fishing nets.

"I sent the tarred cord to the volunteers without unwrapping the pre-packaged balls," recalls Lieder. "They started knitting and everything stuck together because the cord is coated with tar. I didn't understand what the vendor was talking about when I ordered... The knitters had to throw out their needles."

Carol Colburn, professor of theatre in costume design at the University of Northern Iowa, recruited several hand-knitters from the Cedar Falls community to create roughly thirty

chain mail pieces for the university's 1983 production of *Henry IV, Part 1*. The volunteers knit the pieces out of the same white nylon cord, which they then dyed grey.

"We had a great mishap, too," says Colburn, "in that we were planning on dyeing the nylon cord and then we did it and found that the first set of nylon head pieces had shrunk and were child-sized." The knitters went back to work, this time with cord that was already dyed and pre-shrunk. Despite the unexpected do-overs, Colburn's shop was eventually equipped with a range of chain mail pieces, available for use again in other shows.

While hand-knitting has gained much popularity in the last ten years, costume chain mail is not always constructed by hand. Programmable knitting machines can greatly speed up the process, although few theatre costume shops own one of these machines. There are also advantages to recruiting local volunteers to help build the costumes for a production.

"Getting the community involved is a good thing," Colburn says. Enlisting volunteers helps publicize a show, and is often preferable to paying employees overtime or taking up hours of students' already-crowded rehearsal schedules.

Those looking to build a set of chain mail for a production should

keep in mind that as with any complicated chemical process, dyeing can be hazardous and should never be undertaken without appropriate ventilation and other safety equipment. If that equipment is unavailable, look for another type of yarn or cord to use in place of one that must be treated. Independent stores specializing in yarn for knitting and crochet are great resources for finding the right supplies. (Larger craft stores typically stock a limited variety of materials.) Those same stores can also help a theatre teacher or director connect with hobby knitters in the community who may be eager to help out.

Maintenance is relatively simple. To get the maximum lifespan out of the Mylar finish, the knitted chain mail garments are turned inside out and hand-washed in cold water. The garments are then spun in a washing machine and laid flat on towels to dry.

"The Mylar film dulls a little after each wash," Lieder wrote in an email, "but we like the aged patina rather than the bright, shiny finish."

Though knitted chain mail may lack that rattle and clank that come from metal armor, the benefits to the costumer and to the actor wearing it make up for what's lost. After all, theatre itself is a grand illusion. Why can't the armor be an illusion too? ▼