FROM SHEEP TO SWEATER

How did that wool sweater get from a sheep’s outerwear to the designer store’s shelf? It’s quite a process, involving many steps and individuals to create that perfect item.

Rita Kourlis Samuelson, American Sheep Industry Director of Wool Marketing; Dan Gutzman, department manager and buyer for Pendleton Woolen Mills; and Strickland Wheelock, owner of Wheelock Textiles, Uxbridge, Mass., discuss the step-by-step process of wool production – and how exciting the industry is today.

by JILL JOHNSON
a versatile specie

For thousands of years, sheep have been among the most efficient of all the domestic animals. They thrive in extreme conditions of climate and habitat. They produce wool, used for varieties of fabrics; and lamb, one of the most tender meats on the market today.

Samuelson says wool is an international commodity, and sheep are as versatile as the fiber they produce.

"While some breeds of sheep are geared more toward fiber or meat production, if the producer chooses wisely, he can maximize both wool and lamb production," she says. "All parts are used. The sheep provide tender, delicious meat and wool is a renewable resource."

Samuelson says Columbias are popular in the U.S. and are often considered a dual-purpose breed because of their meat quality and wool. However, she says, Columbias have medium-wool fleeces, which are more suited for medium weight woolen garments, like sweaters and socks.

Samuelson says Rambouillet and Targhee are considered popular fine-wool breeds, and their fiber is used to make higher-end apparel.

a variety of uses

Large and small wool manufacturers exist in the U.S. And Gutzman is employed by one of the largest and most unique mills in the country.

Gutzman says he is in a unique position as a wool buyer because he buys and gets to see the product in its fully finished form.

"Where many wool buyers see what they buy as going into top or yarn, at Pendleton we have the unique ability of seeing that as a final product," he says.

Gutzman says fashion ultimately dictates what is sold in Pendleton stores. When planning a professional business wardrobe, consumers often prefer wool. Chosen for its comfort, appearance and longevity, wool garments are suited for many situations and individual styles. Because wool has this versatility, it is both prestigious and practical for a wardrobe.

"Because of the versatility and durability of wool, Pendleton has partnerships with companies like Nike, Hurley and Vans," Gutzman says. "Wool fabrics are used in products where you might not normally think you would see them, like in Vans shoes or a Nike backpack."

On the other side of the country from Pendleton Woolen Mills, Wheelock Textiles is serving consumers with different needs.

Wheelock Textiles operates on a much smaller scale, working with growers or co-ops looking to have their products made for a reasonable price. This philosophy is what makes Wheelock Textiles a great asset to growers that do not produce enough wool to market through larger channels, Wheelock says.

"Being a small manufacturer, I have the flexibility to work with wool co-ops and farms," Wheelock says. "It works out great because some of these growers and co-ops only have 500 to 1,000 pounds of wool, and with that, we can manufacture baby throws; throws; and full, twin, queen and king blankets."

Wheelock says the growers and co-ops that send him the wool often want it made into blankets for retail in small stores, for personal use or for Christmas gifts. He also fills many specialty orders, which includes gloves, fabric for the craft industry and antique car seating fabric.

On average, one sheep can produce anywhere from two to 30 pounds of wool annually. The amount of wool produced greatly depends on the breed, the genetic base, nutrition and shearing interval. Due to their size, rams typically produce more wool than females of that same breed. Once shorn, the journey wool takes to become clothing or personal items is an interesting one.
Wheelock’s longstanding connections with a carder, spinner, weaver and finisher allows him to work with those who supply wool to spin clean wool, card it and design it, depending on the color of the wool and the customers’ wishes.

Despite the use or the manufacturer, wool often goes through the same, basic process to get from the sheep to the store. And what a process it is!

**step 1 – shearing and grading**

Once the producer identifies the type of his sheep’s fiber, it is time to shear, which takes place on the farm or ranch. Samuelson says most producers shear their flock in the spring, generally in April and May. But some may shear as early as February.

“Spring is ideal, because it eliminates the wool in the summer months and the staple length is long after the winter months,” she says.

The shearer usually shears the fleece off in one piece, which is placed in a square pack and pressed.

Next come the buyers, who are often the final judges of the value of the wool. The grower sends a sample to have it objectively measured to determine the micron and yield. This information can be shared before the wool is purchased by a buyer, warehouse or exporter.

Gutzman buys wool several different ways. Approximately 50 percent of the wool he buys is domestic and the remainder often comes from Australia, New Zealand and Uruguay.

“Wool can be purchased directly on the ranch from the producer, from a warehouse, or in cases of foreign wool, from a foreign buyer,” he explains. “When buying directly from a rancher, I will look at the wool to determine quality and make an offer per pound for everything he has. In the warehouse, I will look at samples and a catalog with the test information and determine how much of each type of wool I need. When dealing with foreign buyers, I provide an in-depth description of the product and the amount I need, and it is shipped to the mill.”

Fine and medium-fine wools of longer staple lengths (more than 3 inches) usually make lightweight suits and dresses. Coarser and shorter fibers are generally used for bulky sweaters and carpets, Gutzman says.

**step 2 – washing or scouring**

The next step in the process is washing (scouring) the wool to remove grease (lanolin), vegetable matter and other impurities, which gather in the wool, Samuelson says.

“Buyers take the raw wool and often scour 40,000 pounds at once, which is the equivalent to 5,000 sheep,” she says. “The wool is washed in hot water and mild soap and then rinsed in cold water, and only 50–55 percent of the original 40,000 pounds comes out as fiber.”

She says after the wool is scoured, it is then put through squeeze rollers and a hot-air drying chamber to bring the moisture content to the right level.

Gutzman says lanolin is a wonder of its own. It is separated from the wash water, purified and used in creams, soaps, cosmetics and other products.

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**WORESTED OR WOOLEN:**

**What’s the Difference?**

Rita Kourlis Samuelson, American Sheep Industry International Wool/Pelt Marketing Director; Dan Gutzman, department manager and buyer for Pendleton Woolen Mills; and Strickland Wheelock, owner of Wheelock Textiles, Uxbridge, Mass., say there are two major classifications for wool yarns and fabrics: woolen and worsted. But what’s the difference? And why does it matter?

**WORSTED**

Worsteds are spun from longer, finer wool fibers, like the fibers from a Rambouillet, and are most commonly used to make dresses, suits and crepes.

**WOOLEN**

Woolens are spun from shorter, coarser wool fibers, like those from a Columbia, and are used to make sweaters, carpets and tweeds.

**FROM FIBER TO FABRIC**

Both of these fiber systems go through an extensive process before they are spun into yarn.

Worsted yarns have been carded, combed and drawn. Combing machines further straighten the wool making the individual fibers lie parallel, eliminating shorter fibers. The drawing process gives it a more uniform diameter.

Worsted yarns are twisted tighter and thinner in the spinning process and are manufactured into lightweight fabrics. Woolen fibers only go through the carding process.
step 3 – blending and dyeing
Clean wools from several different batches are often blended at this stage, says Gutzman. Blending unifies the slightly different basic colors of raw wool and helps to standardize staple length and diameter for uniform quality.

“At Pendleton, we blend different types of wool together and sometimes blend it with nylon,” he says.

Wool can be dyed at different stages of the production process.

“Wool can be stock dyed or piece dyed,” Gutzman says. “Stock dying is when the wool is dyed before it is spun into yarn, and piece dying is when the wool had been made into fabric and the entire piece of fabric is dyed. Piece dying wool gives the manufacturer a more uniform color.”

Samuelson adds, “Black faced sheep’s wool has a place in the industry, but because black fibers cannot be bleached, it does not have as much versatility.”

step 4 – carding and spinning
The carding process passes the clean and dry wool through a system of wire rollers to straighten the fibers and remove any remaining vegetable matter. Smooth steel fingers then divide and roll the fibers to create narrow continuous ropes of fibers called slivers. The slivers are then spun into yarn. Spinning machines twist and re-twist the fibers into yarns of a wide variety of qualities including strength, firmness and size, Samuelson says.

step 5 – weaving or knitting
Weaving produces cloth by interlacing two sets of yarn at right angles. Woven fabrics are created on a loom with different sections of the yarn passing through the loom, Wheelock says.

Knitting can be done by hand or machine. Machine knitting is fast and versatile. Knitted fabrics are produced by interlocking rows of yarn and loops, Wheelock explains.

step 6 – quality control and finishing
Quality control inspection is a part of the final step in fabric manufacturing. A thorough examination of the cloth identifies imperfections such as broken threads and variations in color.

Wheelock says the fabric then goes through a finishing process, which gives the fabric a smooth, crisp feel and more stability.

The fabric can also go through chemical finishes, which may be applied to the wool depending on their end use.

“Some of the woolen fabrics carry a washable tag, which means you can wash it in the washing machine,” Gutzman says. “At Pendleton, we use a polymer to cover the fiber.”

Because of the structure of wool, he says, this polymer is critical for wash ability.

“Scales on the wool act like an automobile jack and pull the fibers back into each other when the fabric gets wet and then dries,” Gutzman says. “The chemical process with the polymer covers the scales on the wool so it can’t latch together, and then, it becomes washable.”