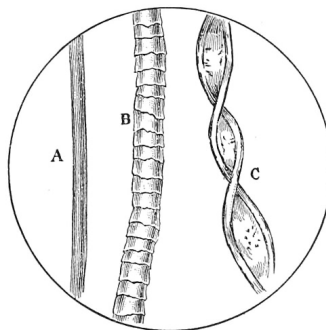


## Cotton Fibers

*Cotton* is the major commercial cellulosic fiber. *Cellulosics* are plant-based. The appearance and feel of fabrics made from cotton are different from protein fibers, wool and silk. Cotton fibers are formed in the seed pod of the plant—when the plant matures, the seed pops open revealing a *cotton boll*—looking like a tiny cloud. Cotton fibers are relatively short in length—shorter fibers are called *staple fibers*. Cotton lengths vary from short staple to long staple.

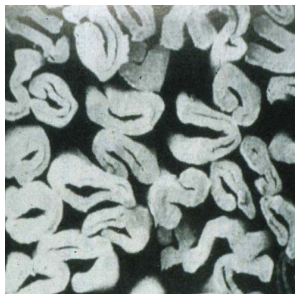
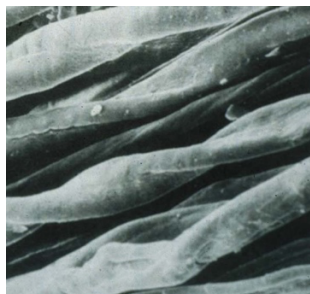


Cotton bolls on the stem



Drawings of  
photomicrographs of silk,  
wool, cotton

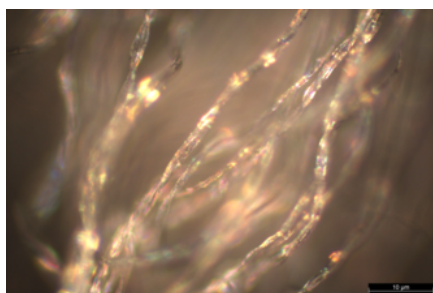
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Photomicrographs of fibers:  
lengthwise and cross-section

LaBat photo collection

Cotton fabrics typically are soft and absorbent—good for baby clothes and underwear. Photomicrographs demonstrate why they have a softer hand than wool, but not as smooth as cultivated silk. A lengthwise view shows *convolutions*—the fibers look like plump twisted ribbons. The cross-section shows a kidney-bean shape—lots of area to hold moisture before it's absorbed internally. The fiber also has a center, called the lumen, if the lumen is hollow it holds water. Combine those properties with a fabric structure like terrycloth—more fiber exposed—and the fabric is even more absorbent.



Photomicrograph of silk

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[https://commons.wikimedia.org/wiki/File:Cotton\\_Fibers\\_at\\_the\\_Micron\\_Scale\\_15%25\\_20.png](https://commons.wikimedia.org/wiki/File:Cotton_Fibers_at_the_Micron_Scale_15%25_20.png)

(Retrieved 4/26/26)

Cotton, like many plant crops, is graded after it's harvested and brought to market. Grade, and prices paid, depend on color (for traditional production, whiter cotton means less bleaching); amount of foreign matter (dirt and other extraneous materials which must be removed); amount of "green" or immature cotton (less quality), and length (longer fibers bring higher prices because the fibers can be spun into smooth high-quality yarns). Cotton lengths are defined as: long staple (1 to 1 ½ inches), intermediate (½ to 5/16 inches), and short (3/8 to 1/2 inches). Long fibers are fine and strong with good luster—exactly what you want for luxury shirts.

### Cotton Descriptive Labels

Many descriptive terms are attached to cotton. Knowing meanings is helpful as you read labels and advertisements.

*Upland cotton* and *Pima cotton* are the two main species of cotton grown in the United States. *Upland* is a medium length cotton fiber used in most cotton (and cotton blend) fabrics like denim, gingham, broadcloth and more. *Pima cotton* is a long cotton fiber used in fabrics like voile and batiste.

*Egyptian cotton* (grown in the Nile River Valley) are long fiber types that convey quality and higher price.

*Sea Island cotton* is the rarest, long-staple cotton originally grown on the Sea Islands of South Carolina and Georgia. It is now grown in the British West Indies and certified for authenticity by the West Island Cotton Association. <https://www.seaisland-cotton.com/#history>

*Combed cotton* on a label indicates that an extra process was used to remove short fibers. Every extra process adds cost.

*Mercerized cotton* is produced by applying caustic soda to cotton fibers, yarns, threads, and fabrics. The caustic soda swells the fiber making it plumper with a rounder cross-section, resulting in a smooth hand and enhanced luster. When sewing fabric, mercerized cotton thread glides smoothly through the fabric.

*Indian cotton* and *Asiatic cotton* (rarely seen on fabric labels) are terms applied to very short, coarse, low luster cotton species.

*Raw cotton* has been *ginned* but not *carded*. Cotton seeds and sometimes small pieces of the cotton plant are mixed in the minimally processed batt of fibers. Raw cotton is low cost often used for stuffing or cushioning when it's acceptable to have some plant matter remaining.

*Ginning* (remember Eli Whitney's cotton gin?) is a process to remove foreign matter from the fibers. *Carding* is a process to align fibers in preparation for spinning yarns.

### Cotton Environmentally Friendly?

Some cotton properties make it environmentally friendly, for example cotton is naturally biodegradable—think of putting plant materials from your garden into a compost bin—the plants eventually decompose. However, traditional cotton production requires a lot of water and energy which can negate earth-friendly benefits. New production methods are being developed to overcome these problems, reducing toxic production methods. Some terms may help as you read labels and make purchase decisions.

*Organic cotton* is grown without synthetic pesticides, fertilizers, or GMO (genetically modified organism) seeds. To learn more go to the *Cotton Incorporated* web site: (<https://cottoninc.com>) with information for consumers on cotton sustainability, denim recycling, and more.

*GOTS-certified cotton* is an international effort to certify sustainable and ethically produced textiles organized by the Global Organic Textile Standard (GOTS) with headquarters in Stuttgart, Germany. The web site describes the organization's goals:

<https://www.behindtheseams.eco/meet-gots>

*Naturally colored cotton.* Sally Fox is credited with developing the first naturally colored cotton in the United States. Naturally colored cottons go back to original cotton species and range from beiges to pinks to greens. Naturally colored cotton bypasses the toxic bleaching and dye processes often used for cotton. *Foxfibre* is the Sally Fox brand.

### Cotton Performance

Naturally absorbent: Cotton is highly absorbent because it is almost pure cellulose which is hydrophilic (water-loving). Cotton can absorb about 25 times its weight in water. See the *How Stuff Works* web site: <https://www.home.howstuffworks>

Blends well with other fibers: Cotton fiber's convolutions intertwine nicely with other fibers. Cotton blend fabrics are common, for example cotton may be blended with polyester to reduce wrinkling or limit shrinking.

Moderate to above average strength: Cotton is stronger wet (unlike wool) making it an excellent fiber for use in fabrics that are laundered.

Alkali (detergent) resistant: Cotton (unlike wool) is not damaged by alkalis, so detergent use will not harm cotton fabrics.

Cotton fibers are dimensionally stable (shrink resistant): Cotton fabrics may shrink because cotton fabric processing often involves putting the knit or woven fabric under tension to apply finishes. When the fabric is laundered the fabric "relaxes."

Lacks resilience: Cotton fabrics "wrinkle" because the fibers have little natural resilience.

Damaged by sunlight: Like most natural materials, sunlight will damage cotton—some dyes used on cotton fabrics accelerate damage.

Mildew and silverfish prone: Caution when storing cotton fabrics that are not thoroughly dry.

Typical cotton fabric names (may also be blends, see structure sections for more information):  
batiste, calico, canvas, corduroy, crinoline, denim, drill, duck, flannel, muslin, oxford cloth, plisse', poplin, sailcloth, terrycloth, voile, waffle cloth,

Resources:

*Cotton Incorporated* web site: *The Fabric of Our Lives®* includes a care guide, information on stain removal, descriptions of cotton fabrics, and more. <https://www.thefabricofourlives.com>