Silk Production in China

Stage 5 Textiles Technology

By Cate Cotterell

https://pixabay.com/photos/textile-factory-yarn-warp-industry-3751272/

SILKWORM RAISING ROOM

The rural area in Suzhou has long been known as 'the home of silkworm and mulberry trees'. Mulberry bushes (the white mulberry variety *) are seen everywhere around the farmhouses and along criss-crossed footpaths between fields.

As the season for raising silkworms approaches, all the raising rooms are made spotlessly clean. Strangers are forbidden to visit so as to avoid grease and cosmetics.

https://pixabay.com/photos/silkworm-cocoon-insect-silk-nature-2766232/

The silkworms are fed four to five times a day over the 24-hour period during their raising. On cloudy or rainy days the mulberry leaves have to be wiped dry, or dried out.

The silkworms mature at around twenty-five (25) days, by which time silkworm-raising women have busied themselves making bundles of straw for them to climb onto to weave their cocoons.

COCOON GRADING

The grading of cocoons is the first procedure of the silk-reeling production.

The silkworms, because of their individual differences, and differing environments in which they are producing silk and cocooning, make cocoons of varying quality. Some of them can be used for silk reeling while others cannot.

The aim of grading is to pick out the cocoons not suited to reeling. Suitable ones should have a clean, white colour, a good lustre, uniform layer thickness, and a neat shape and size. They are called 'firstchoice cocoons', and may be used for silk reeling. Twin cocoons are often used to make silk floss quilts.

The hand-reeling wheel appeared after the Qin-Han period, and was in common use during the Tang dynasty.

The cocoons were boiled in a cauldron, while being spun at the same time. A woman sat by the boiler, found the filament-end with her left hand, swung the reeling handle with her right hand to revolve the spinning utensil on the wheel, and let the filaments wind the silk threads. The threads would dry out during the course of winding.

The woman reeling silk in this way could monitor the water temperature, sensing the degree by hand, and the amount of silk thread required. The water used for preference was, in order, rainwater, spring water, from the river, from the lake, or from a well-according to its quality. Clear water would make the silk whiter, and pure water would make the silk lustrous.

SILK-REELING TODAY

The cocoons are placed in soapy water to soften the gum that holds them in place.

Once the gum has softened, the fibre is free to be reeled into hanks of raw silk (similar to a sliver). A hank of raw silk is dull, so a mild alkaline solution is applied to remove the silk's natural gum coating. This process is known as 'degumming'. and is used to

https://pixabay.com/photos/silk-yarn-thread-spool-thread-196543/

reveal the much sought-after pure. shiny silk fibre.

Following the degumming process, a twist is inserted into the fibres to produce a yam. The purpose of twisting (involving combing, drawing and spinning) fibres is to hold them together to form the yarn. Twist is the most important factor in determining the properties of a yarn, for without it yarns have little strength.

Twist can be inserted in either a clockwise (S-twist) direction or anti-clockwise (Z-twist) direction.

Light is reflected from S- and Z-twist yams in opposite directions. This means that if you alternate groups of S-twist and Z-twist yarns, you can create lustrous stripes in the fabric.

Jacquard is an intricate weave, because individual warp yarns can be raised or lowered on the loom. Jacquard patterns may be combinations of plain, twill and satin weaves. Jacquard fabrics contain long floats, as some of the pattern is created by a satin weave. Fabrics produced on jacquard looms are expensive due to their intricate designs.

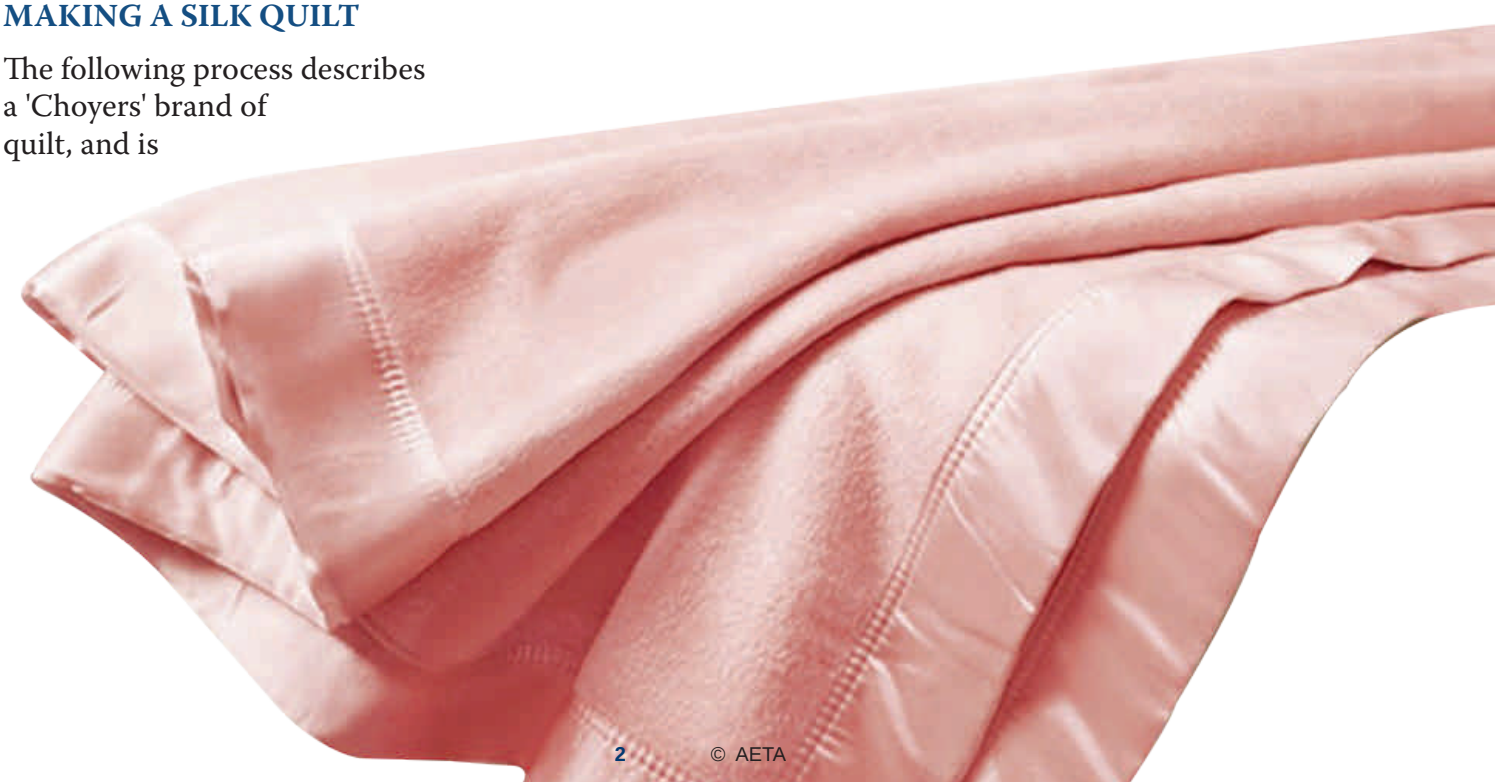
MAKING A SILK QUILT

The following process describes a 'Choyers' brand of quilt, and is interpreted [with some difficulty] from an ancient translation.

First, pick high-quality doupioni silk cocoons and put them into boiling water. Then the workers tear the cocoons and take the pupas out. They form a small arch with ten cocoons, to make a small silk layer. Finally, four workers stand at the four sides of a table and pull the big silk layers that they have already dried to make a silk quilt. It needs about one hundred big silk layers to make a general-weight silk quilt.

https://pixabay.com/photos/silkworm-cocoon-silk-manufacture-2456852/

https://pixabay.com/photos/cocoons-silk-cocoons-silk-thread-1571946/



SILK WORKSHEET 1 by Cate Cotterell

Suitable for Years 9/10 (Stage 5) Textiles Technology,
and Years 11/12 (Stage 6) Textiles and Design

- SILK is a natural ..... filament fibre produced by the .....
- Silk fibres are ..... crystalline.

PHYSICAL PROPERTIES

- Strength

- The silk filament is very ..... because it is highly crystalline. Silk products are usually considered very delicate due to the high expense of production and construction.

- Elasticity

- Silk does not possess great elastic qualities due to its high degree of crystallisation. Silk is more elastic when ..... and this needs to be taken into consideration when .....to avoid .....
  When comparing the elasticity of silk with other fibres and filaments, silk is more elastic than ....., but wool has a ..... elastic property.

- Resilience

- Silk has been known to have ..... wrinkle recovery, but it depends on the construction of the garment. Lightweight articles tend to wrinkle ..... than heavier weight products. Wrinkles tend to come out more easily when moist. This factor may be taken into consideration when laundering silk garments, as ironing (particularly with a ..... component) loosens the bonds between the long chain polymer molecules in the fibres of the material. Steam ironing further loosens ..... bonds within the fibres.

- Absorbency

- Silk has slow absorbency due to its crystalline polymer system.

- Thermal properties

- Silk is very sensitive to heat so you need to be very careful when ironing silk garments. Heat ..... silk and a too-hot iron will quickly burn holes in it.

- Shrinkage

- Silk is a stable fibre and will not shrink. However, care needs to be taken with delicate silk products as many are made from loose weaves that may shrink easily. For this reason, ... is the recommended method of laundering silk garments.

- Conductivity

- Silk is a ..... heat conductor. However, generally silk feels ..... against the skin due to its smooth nature.

- Dye acceptance

- Although silk is a ..... absorber of moisture, it accepts dye readily and is therefore easy to .....

CLOSED PASSAGE: slow, more, cotton, cool, steam, wet, poor, good, hand-washing, intermolecular, yellows, distortion, dye, silkworm, superior, handling, strong, 65-70%, protein

SILK - WORKSHEET 1 ANSWERS

- SILK is a natural **protein** filament fibre produced by the silkworm.
- Silk fibres are **65 - 70%** crystalline.

PHYSICAL PROPERTIES

- Strength

- The silk filament is very **strong** because it is highly crystalline. Silk products are usually considered very delicate due to the high expense of production and construction.

- Elasticity

- Silk does not possess great elastic qualities due to its high degree of crystallisation. Silk is more elastic when **wet** and this needs to be taken into consideration when **handling** to avoid **distortion**.
- When comparing the elasticity of silk with other fibres and filaments, silk is more elastic than **cotton**, but wool has a **superior** elastic property.

- Resilience

- Silk has been known to have **good** wrinkle recovery, but it depends on the construction of the garment. Lightweight articles tend to wrinkle **more** than heavi'er weight products. Wrinkles tend to come out more easily when moist. This factor may be taken into consideration when laundering silk garments, as ironing (particularly with a **steam** component) loosens the bonds between the long chain polymer molecules in the fibres of the material. Steam ironing further loosens **intermolecular** bonds within the fibres.

- Absorbency

- Silk has slow absorbency due to its crystalline polymer system.

- Thermal properties

- Silk is very sensitive to heat so you need to be very careful when ironing silk garments. Heat **yellows** silk and a too-hot iron will quickly burn holes in it.

- Shrinkage

- Silk is a stable fibre and will not shrink. However, care needs to be taken with delicate silk products as many are made from loose weaves that may shrink easily. For this reason, **hand washing** is the recommended method of laundering silk garments.

- Conductivity

- Silk is a **poor** heat conductor. However, generally silk feels cool against the skin due to its smooth nature.

- Dye acceptance

- Although silk is a **slow** absorber of moisture, it accepts dye readily and is therefore easy to **dye**.

SILK - WORKSHEET 2