The History of Silk Fabric and Its Production Process/ Method

Musarat Merchant

New York City College of Technology

Course Name: Textiles

Faculty: Dr. Nazanin Hedayat Munroe

Abstract

This paper is based on the research of the silk fabric, it is regarding its history, how it came to existence and how it became popular all over the world from China. It also discusses important topics such as, the process of creating silk in full depth. It covers how silkworms are raised and how their cocoons are harvested and used to create filaments, and how they undergo the rest of the steps such as dyeing, spinning, weaving and binding. It also informs the readers about the things to look for when buying expensive silk/ how to differentiate between cheap silk and expensive silk.Also, it educates the readers about different types of silk available in the marketplace.

Keywords: “Bombyx mori” a breed of an average silkworm. “Filament” long and continuous strands of fiber (measured in yards). “Protein fiber” a natural fiber made from an animal source (example, silk from silkworms)

The History of Silk Fabric and Its Production Process/ Method

Silk is a natural fiber which was, “first produced in Neolithic China from the filaments of the cocoon of the silk worm.” (Cartwright, M., 2019). It is further classified as a protein fiber as it is made from silkworms, which is an animal source. Our average silkworm is known as *bombyx mori* which gives us cultivated silk. About 3000 cocoons make only 1 pound of silk which is why silk is so expensive! The mulberry leaves which are fed to the silkworms are also a part of the cost of the silk production. This study will review the history of silk, and analyze different types of silk, and what methods and processes this fabric goes through before it transforms into a beautiful garment. In addition, it reveals how can one differentiate between cheap silk and expensive silk.

The story behind the discovery of Silk

Silk is defined as “animal fiber produced by certain insects and arachnids as building material for cocoons and webs, some of which can be used to make fine fabrics” by the Editors of Encyclopedia Britannica. “Silk exudes elegance and sophistication by its shine and opulence. It has several attributes which set it above other fibers. Silk is both softer than human hair but as strong as wire.” (Misachi, J. 2017).

According to a Chinese legend, once “the wife of the mythological Yellow Emperor, Huangdi, who taught the Chinese people art; throughout history the empress was ceremonially associated with sericulture” (Britannica). Her name was Lady His-Ling-Shih, (Leizu) and she is given the credit for the discovery of rearing silkworms to produce silk. Once, she was sitting and having her tea in the imperial gardens. Out of nowhere, she noticed that a cocoon fell into her teacup and unraveled due to the extreme heat of her tea. She saw that the cocoon was made up of long staple fibers which we call *filaments* also that it was strong and soft. Through that incident,

Liezu learned how she could combine the silk fibers into a thread. Later she created a loom which would combine these treads into a soft and lustrous fabric. She had a forest of mulberry leaves which is what she fed her silkworms and in the next years she passes down her techniques to make silk to rest of the Chinese people. (Ducksters.com)

The process of making silk - Sericulture

"Producing silk is a lengthy process and demands constant close attention. To produce high quality silk, there are two conditions which need to be fulfilled – preventing the moth from hatching out and perfecting the diet on which the silkworms should feed." (Lee, A. C. Y). It is advised that the eggs must be kept at 65 degrees F and gradually increase it to 77 degrees F towards the time when the eggs are ready to hatch successfully. After the hating of eggs, the silkworms that come out of those eggs are fed with carefully handpicked and finely chopped mulberry leaves till the point where they get fat due to excessive feeding. These worms are fed until they have stored sufficient amount of energy in their bodies so that they can enter the cocoon stage.

During their growing period, they should be protected from things such as loud or unpleasant noises, drafts, and even strong smells such as those of fish or meat, or even the human sweat. They spend about three to four days spinning inside their cocoon around themselves till the point they look like white puffy balls. Around eight to nine days in a dry and warm spot the cocoons are ready to unwound. To kill the worms, they are steamed or baked first and then they are dipped into hot water so that the woven filaments can be easily loosened. A filament is long staple fiber, and in the case of silkworms its filaments are typically "between 600 and 900 meters long! Between five and eight of these super-fine filaments are twisted together to make one thread." (Lee, A. C. Y).

Finally, those silk threads are further woven in cloth or used in textiles for embroidery work. People love silk because of its amazing properties such as, it is super lightweight, it is very easy to weave, it takes dyes beautifully, it has great luster, it is super absorbent. But out of all of there properties the one that I like the most is that one can wear silk at any point of the year because silk is the one fabric which is warm in winter and feels cool in summer!

Steps in Producing Silk.

As we said before, the first step is to raise silkworms and harvest cocoons, the second step is the extraction of the silk thread from the silkworms. The third step is dyeing the silk threads that we just extracted. The fourth step is spinning those yarns, the fifth step is to weave them, and the sixth step is binding them all together as we do for Ikat. (*Maven, D.I.Y.)*

How to tell the difference between cheap and expensive silk?

"Silk is an expensive fabric. With multiple factors affecting its price such as manufacturing difficulty, handling issues, and controls on output from suppliers. You can find a **$49** 100% silk shirt at Uniqlo and head to Equipment to see that their 100% silk shirt is priced at **$200**!" (*Siizu, blog*) The drastic difference in silk prices is because there are a few factors that affect the quality of silk we all buy.

The first thing to focus on is the raw material of the silk that you are buying. Similar to cashmere, silk comes in many different types, so it is expected to have different price points. Typically, the price of a yard of silk can vary from $8 to $80 depending on the areas or silk farms their raw material comes from. "Organic silk tends to be more expensive as the price to manage sustainably may be higher." Another thing to look at is the luster of the silk. "The *lustre* of the expensive silk is the result from combining threads of different single colors in each of the weft and wrap. These make the surface shine and appear to change color as the angle of light on

it changes." Take your silk shirt, place it up to a light source and see how it reflects light as compared to the other silk products you have. Also, look at the finish of your silk garment as it is said that the more expensive silk goes through some special fabric treatments before it is ready to be used in comparison to the cheap silk. You can tell the difference in the feel of the silk through the sand washing process, which is known to make garment wrinkle resistant and gives it a soft and smooth finish. The increase in luster and color shows that the silk has gone through the process of sand washing. The dyeing process of silk also shows whether it is expensive or not, the expensive silk tends to have a dye that fades less and lasts longer. The weight of the silk also reflects its price. "The silk momme (a unit of measurement for silk fabrics weight) reflects the price and quality. Higher momme weights equal higher quality silk." (*Siizu, blog*).

Different types of silk.

"Mulberry silk is the most common and widely used silk around the world, and accounts for about 90% of the world's supply." This kind of silk is the silk that we get from our ideal silkworm called Bombyx mori who eat mulberry leaves, hence the name! This silk is in demand in East Asian countries such as China, Japan and Korea. The downside of this type of silk is that it requires special care to maintain is smoothness. Then we have many other different types of silk such as, Tasar silk, Eri silk, Muga silk, Spider silk, Mussel silk, Anaphe Silk, and Coan silk. (Misachi, J. 2017).

Ahimsa silk is another type of silk, which is an eco-friendly kind of silk an Indian man came up with this brilliant idea because he noticed that it takes the lives of 30,000 to 50,000 silkworms just to create a 6 yards long silk saree (traditional Indian drape). The word *ahimsa* literally means non-violent in Hindi. Kusuma Rajaiah who studied fibers and filaments at Indian institute of Handloom Technology for three years says and is heavily influenced by Mahatma

Gandhi's non-violent practices says that, "We dispensed with the conventional method of boiling live silk worms in their cocoons to extract the requisite filament/thread, instead, we allow the silk moths to pierce their cocoons naturally and come out from their metamorphosis and live their fullest life peacefully. We then use the pierced cocoons to extract the required yarn, spin the silk fiber and make fabric out of it. This is how we are spreading the concept of Ahimsa to the world," he explains. (Khanna, J. M., 2019). Ahimsa silk is a great choice in my opinion as it doesn't kill the poor silkworms and the silk is just as soft and durable as the regular silk we find in the market.

References

Ancient China. (n.d.). Retrieved November 25, 2019, from https://www.ducksters.com/history/china/legend_of_silk.php.

Cartwright, M. (2019, November 21). Silk in Antiquity. Retrieved November 25, 2019, from https://www.ancient.eu/Silk/.

Khanna, J. M. (2019, October 2). Did you know about Ahimsa silk, the eco-friendly fabric created without killing any silkworms? Retrieved November 25, 2019, from https://www.vogue.in/fashion/content/ahimsa-silk-eco-friendly-fabric-silkworms.

Lee, A. C. Y., & Silkroad Foundation. (n.d.). History of Silk. Retrieved November 25, 2019, from http://www.silkroadfoundation.org/artl/silkhistory.shtml.

Maven, D. I. Y. (2019, July 23). How to Make Silk in 6 Steps. Retrieved November 25, 2019, from https://www.curbly.com/4394-how-to-make-silk-in-6-steps.

Misachi, J. (2017, March 29). How Many Types Of Silk Are There? Retrieved November 25, 2019, from https://www.worldatlas.com/articles/how-many-types-of-silk-are-there.html.

The Editors of Encyclopaedia Britannica. (2019, March 7). Silk. Retrieved November 25, 2019, from https://www.britannica.com/topic/silk.

What Is The Difference Between Cheap Silk and Expensive Silk? (n.d.). Retrieved November 25, 2019, from https://siizu.com/blogs/fabric-talk/what-is-the-difference-between-cheap-silk-and-expensive-silk.

Figures

Figure 1. SILK FILAMENTS

Silk Filaments after dyeing, Urgup, Tur/ Georges Jansoone.

https://cdn.britannica.com/69/131869-004-73A51233/Silk-filaments-dyeing-Urgup-Tur.jpg

Figure 2. SILKWORM COCOON

Commercial Silk made from the fibrous cocoons of silkworm caterpillars (*Bombyx* species) / *Vibe images/ Fotolia*

https://cdn.britannica.com/97/158197-050-CB4AA5EA/silk-cocoons-silkworm-caterpillars.jpg

Figure 3. SILKWORM

Domesticated silkworms (*Bombyx* species) on mulberry leaves. *Roman Sigaev / Fotolia*

https://cdn.britannica.com/38/157438-050-6D22A3DF/silkworms-mulberry-leaves.jpg

Figure 4. SILK

Detail of handwoven Italian silk brocaded on silk with floral motif, c. 1730-50.

Courtesy of Scalamandre, New York City

https://cdn.britannica.com/36/30236-004-1D903BD6/Detail-silk-motif-Italian.jpg

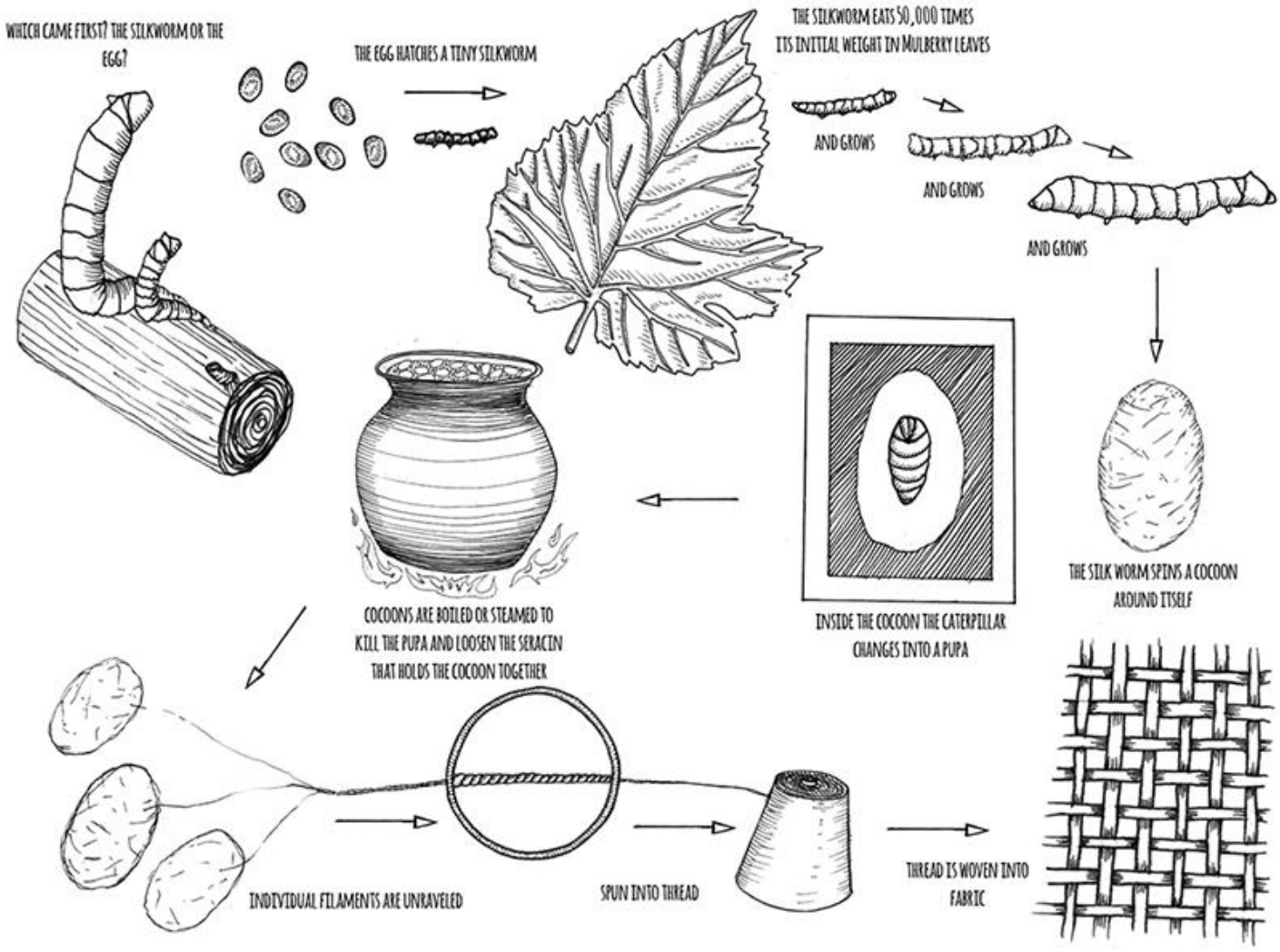

Figure 5. HOW SILK IS MADE?

Retrieved from: https://cdn1.pandasilk.com/wp-content/uploads/2016/06/From-Silkworm-to-Silk-Fabric.png