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## A Short History of Linen

by: HL Sine Gunnsdottir  
(Janis M. James - 2005/07)

Working with natural fibers has always been one of my greatest interests. The most obvious were wool and cotton, in all the forms they were made available. One day I found silk. Oh - the joy of silk. How it looks and feels, then the wonder of working with such strong yet delicate threads. It soon became very important to me to find the fibers that have been used since the beginning of our history. I didn't know a lot about linen, other than that it was usually comfortable and creased a lot on wearing. Irish linen sheets lasted several lifetimes and that it was more expensive than I could usually afford. Then I was given an opportunity to work with some first class pure linen and I was sold. I was lost in dreams of the perfect fiber and all that it could create. Over the past 25 years I have never lost my love of linen and all it offers.

**Linen** is one of the earliest products known to civilization. When man was in his earliest primitive state, living on the wide animals he hunted, the skins of those animals formed his only clothing. Later, when nomadic communities formed, driving herds of cattle and sheep across the lands of Eastern Europe during those great migrations, the wool from those flocks of sheep was used to clothe their owners.

After a long period of history, man settled down, built himself permanent cities, and cultivated the land. One of the products of the soil was flax, and out of the fiber from flax, linen was made. Linen is, therefore, the earliest known vegetable fabric to be woven.

### The Antiquity of Linen

An archeological dig carried out at the site of Neolithic lake dwellings in Switzerland turned up charred remains of food prepared from flaxseed, and remnants of linen threads, ropes, clothe and fishing nets. So, man had already been growing flax as far back as Neolithic times. Traces of flax cultivation relating to the Bronze Age were found in archeological excavations in Spain. However, most of the finds of early flax cultivation relate to the Iron Age. They show that perennial narrow-leafed flax was cultivated all across Europe as far as Scandinavia.

Archeological excavations at the site of Iron Age settlements in Germany discovered remains of bread prepared from wheat, millet and flax seeds. Many archeological finds, literary records and linguistic studies also point to India, Turkmenistan, Asia Minor, Transcaucasia, Abyssinia, Algeria, and Tunisia as ancient flax cultivation areas.

Domestication of fiber flax to say nothing of seed flax occurred in India and China before that of cotton - more than 5,000 years ago. Some scholars believe that flax originally came from western Persia and spread over to other countries regarded to be the regions of early flax cultivation - India, China and Central Asia and westwards and southwestwards, primarily, to Babylon and Egypt.

Linen was heavily used in the Mediterranean in the pre-Christian age. Linen was sometimes used as currency in ancient Egypt. Egyptian mummies were wrapped in linen because it was seen as a symbol of light and purity, and as a display of wealth. Some of these fabrics, woven from hand spun yarns, were extremely fine and the fineness of the yarns in them cannot be produced even today on spinning machines.

Flax, from which linen is made, is one of the oldest agricultural plants in the world. Over 5000 years ago the Egyptians named it "woven moonlight", due to its very singular beauty. A little less poetic, but all the more apt, is the Latin appellation: "linum usitatissimum" - the extremely useful flax plant.

When the tomb of the Pharaoh of the Exodus, Rameses II, who died 1258 BC, about 3000 years ago, was discovered in 1881, the pure linen wrappings were in a state of perfect preservation.

The mummy of "Kaboolie", a daughter of a priest of Ammon, who died 2500 years ago, is preserved in the library of Belfast, Ireland. The linen on this mummy is also in a state of perfection. Present research in Egypt has resulted in many wonderful discoveries, and it is a matter of historical accuracy that when the tomb of Tutankamen was opened, the linen curtains were found intact but all the other fabrics had crumbled to dust.

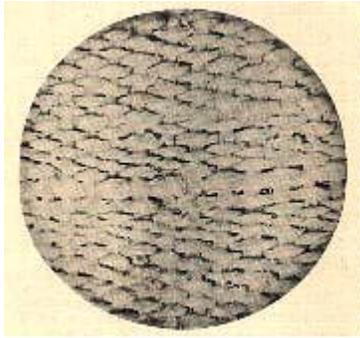


A linen mummy shroud (with the mummy inside it)  
Egypt, about 1000 BC (Vatican Museum, Rome)

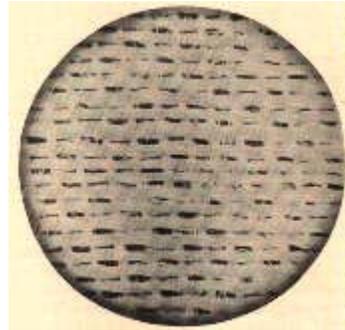


Flax harvesting,  
"Senedjem"'s tomb, Ancient Egypt.

In the British Museum, London, are pieces of mummy linen at least 6000 years old. During recent examination, cuttings from these linens were microscopically examined and photographed (as shown) at the Linen Industry Research Institute, Belfast, Ireland, and were found to be as structurally perfect as linen made today.



Egyptian Linen 1<sup>st</sup> Dynasty



Modern Linen - Recently Woven

Flax has been used in the Middle East since the fifth millennium BCE. In Egypt its role was probably more important than in many other cultures, as Egyptians rarely used wool and cotton was unknown during much of their ancient history. It was seen as a gift of the Nile, as the Hymn to Hapi has it: *People are clothed with the flax of his fields*

Through time linen has persisted. Its history is also closely interwoven with the Bible stories. Linen has always been held in reference as an emblem of purity, and it is mentioned frequently in the Old Testament.

The tribes of Israel used as their central point of worship, the Tabernacle. We are told that the curtains in the Tabernacle were made of fine linen, and when the high priest, Aaron, entered that holy place, he put on a holy linen coat & girdle and upon his head was a linen Mitre. In the history of ancient times, linen holds a truly unique place. This is also confirmed in the New Testament, which states that the seven angels who held in their hands the past and future of mankind, were clothed in pure and white linen. Again from the Book of Revelations we are informed that the garments of those chosen for eternal life and happiness will be of fine linen.

One hundred years after the birth of Christ, Plutarch wrote that the priests of Isis wore linen because of its purity. It was not just a precious fabric of the Israelites.

In ancient times, in almost every country, those who stayed on the land grew flax and wove the linen for its own use, but the earliest records of an established linen industry are about 4000 years old, and come to us from Egypt.

The Phoenicians, with their merchant fleets, opened many channels of commerce and trade to the peoples of the Mediterranean. It was the Phoenicians who introduced flax growing and the making of linen into Ireland before the birth of Christ, but it was not until the twelfth century that we can find records of proper attempts to systematize flax production in Ireland.

Gauls and Celts, the earliest flax growers in Western Europe, learned about flax from Romans while Slavs, who were the first to start cultivating flax in eastern Europe, brought it from Greece. In the regions of early flax cultivation in Central Asia (Afghanistan, mountainous areas of Bukhara, and Turkmenistan) flax cultivation has remained primitive until the turn of the 20th century.

Flax has been known in Russia since 2000 B.C. Ancient manuscripts of the 9th-10th century B.C. contain evidence of linen made by Slavs. Oriental writers of the time described Slavs attired in linen clothes. Prior to the formation of Kievan Rus, all Slavic tribes that inhabited the eastern European plain raised flax. Flax was used to make sailcloth, fishing nets, ropes and linseed oil. In the 10th-11th centuries A.D. flax was extensively grown for fiber and seed. It was regarded to be an important crop both for crafts and commerce. Peasants used it to pay feudal dues and make payments to the czar's treasury. Russian princes collected tribute in linen. Because of the amazing versatility of the plant - perhaps only to be compared with the role that bamboo plays in the Asian culture - people have always held it in high esteem.

Linen is the most ancient vegetable fabric known to man. For centuries people have been growing flax to make fiber and weave linen. But despite its venerable age flax remains to be as young as ever.

**Flax** is the raw material of Linen. A beautiful, unique plant that produces high quality fabrics.



Flower flax field

### The Properties and Description of Flax

The botanical name of the flax plant is *Linum usitatissimum*. The English word, linen, is derived from the generic name, *linum*, and the term lint, from the old Scottish word, *lin*.

Today flax is a prestigious, expensive fiber and only produced in small quantities. It has a long "staple" (individual fiber length) relative to cotton and other natural fibers.

Flax blooms in clusters of bluish, navy-blue, and, more seldom, violet, rosy and white flowers that open up at dawn and close and fall at around noon when heat sets in. Each flower blooms for a few hours. Bees collect close to fifteen kg of honey from one hectare of flax field.

Flax fibers vary in length from 2 to 36 inches and average 12-16 micrometers in diameter. There are two varieties: shorter tow fibers used for coarser fabrics and line fibers used for finer fabrics. Flax fibers can be identified by their typical "nodes" which add to the flexibility and texture of the fabric. The cross section of the fiber is made up of irregular polygonal shapes which contribute to the coarse texture of the fabric.

The flax plant is an annual and is grown both for its fiber and the seed. The stem of the fiber plant is slender and tall and the fiber consists of the skin surrounding the woody core of the stem. Flax-seed is used for making linseed oil and also linseed meal for feeding purposes. Flax seed has also been found to be very beneficial in healthy diets.

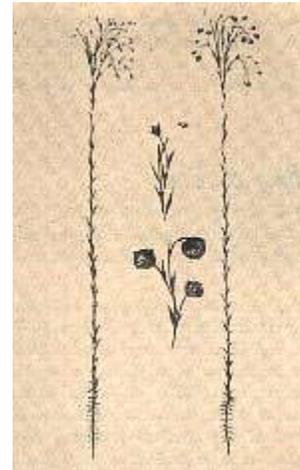
The flaxes grown for fiber and seeds are the same family, but they have developed different habits of growth. For fiber purposes the seed is sown thickly to prevent it from branching which would ruin it for fiber. The linseed type of flax has lost its capacity to produce worthwhile fiber and the fiber type produces on a limited amount of seed. The flax flower is either blue or white and a flax field in bloom is a very pretty sight.



Flax for Fiber



Flax for Fiber



Flax for Seed

The quality of the finished linen product is often dependant upon growing conditions and harvesting techniques. To generate the longest possible fibers, flax is either hand-harvested by pulling up the entire plant or stalks are cut very close to the root. After harvesting, the seeds are removed through a mechanized process called "rippling." The fibers must then be loosened from the stalk. This is achieved through "retting" which uses bacteria to decompose the pectin that binds the fibers together. There are natural retting methods that occur in tanks and pools or directly in the fields. There are also chemical retting methods which are faster but are typically more harmful to the environment and to the fibers themselves. At this point, the

stalks are ready for "scutching" which takes place between August and December. Scutching removes the woody portion of the stalk by crushing them between two metal rollers so that the parts of the stalk can be separated. The fibers are removed and the other parts such as linseed, shive, and tow are set aside for other uses. The short fibers are separated by "hackling" or combing them away, to leave behind only the long, soft flax fibers. After the fibers have been separated and processed, they are typically spun into yarns and woven or knit into linen textiles. These textiles can then be bleached, dyed, printed on, or finished with a number of treatments or coatings.

### Flax Production

The finest quality flax is produced in Western Europe, with Belgium growing, without question, the highest quality fiber produced anywhere. Used primarily for handkerchiefs, damask table linen and in fact for everything requiring the finest texture. Italy also produces a quality product.

Irish flax can be very good and is particularly strong, but quality due to the damp weather can be irregular. For that reason the seed from the Irish crop is rarely saved. Since about 1950 Canadian seed has the preference for Irish Linen. The dry climate of Canada, while not good for producing fiber, seems to impart an added vitality to the seed, which is then shipped to Belfast.

Russia and the Baltic States, by far, produce approximately 90% of the total flax crop of the world. Russia grows the low, coarser grades of flax and the Baltic States produce more of a medium quality fiber. Recently flax production has moved to Eastern Europe and China.

Germany, France and the Czech Republic are producers of flax, but mainly for home use. Holland also produces flax, and Dutch flax-seed has been famous for years.

The growing of good flax is expensive and the growing conditions must be suitable if satisfactory results are to be obtained. The climate and soil are very important, as, with the same seed and different types of land, different results will be obtained. The flax crop is pulled, not cut, because if it was cut it would be injured and valuable fiber would be lost. Hand pulling is therefore essential for the larger proportion of the total flax crop, and it is a tedious, expensive operation.

(There are now mechanical pulling machines, but they are only suitable for large fields and for early harvest with no rains. Rain will "lodge" portions of the crop so that the machine will not be able to get hold.)

Flax thrives on poor soil, and even when using conventional methods of cultivation, it requires only small amounts of fertilizer. In fact, it reacts to overdoses of fertilizer by producing fibers of reduced quality. Monocultures, with their negative consequences for the quality of the soil and for the animal world, are automatically prohibited: flax can only be grown twice on the one field before signs of "flax fatigue" begin to appear. An interval of seven years is necessary before flax can be cultivated on the same field again. Pesticides - with just one exception,

which is in cases of acute fungal infestation - are not necessary. **Absolutely no chemical medium** is required in order to loosen the fibers from the stem. This can be achieved after the harvest either through the traditional method of rotting or "retting" the flax on the ground (which means allowing the natural rotting of the woody sections of the plant through fungi and microbes to take place) or through applying modern techniques which achieve the same thing by utilizing high pressure steam.

### Linen Fiber

A characteristic often associated with linen yarn is the presence of "slubs", or small knots that occur randomly along its length. However, these are actual defects associated with low quality. The finest linen has a very consistent diameter with no slubs.

Linen fabrics have a high natural luster and their natural colour ranges between shades of ivory, tan or grey. Although not good for the fabric, pure white linen is created by heavy bleaching. Typically, linen has a thick/thin character with a crisp and textured feel to it, but it can range from stiff and rough to soft and smooth. When properly prepared, linen has the ability to absorb and lose water rapidly. It can even gain up to 20% moisture without feeling damp. It is highly absorbent and will quickly remove perspiration from the skin. As it is a stiffer fabric it is less likely to cling to the skin and when it billows away it tends to dry out and become cool, so the skin is being continually touched by a cool surface. Perfect for hot, humid & dry weather.

Linen is a very durable, strong fabric, one of the few that is stronger wet than dry. It doesn't stretch and is resistant to abrasion. However, it has low elasticity so it can break if it is folded repeatedly at the same place. Mildew, perspiration and bleach can damage linen, but it is resistant to moths and carpet beetles. Linen is relatively easy to take care of since it resists dirt and stains, has no lint or pilling tendencies and can be dry cleaned, machine washed or steamed. Linen can withstand high temperatures and has only moderate initial shrinkage.



Linen cloth recovered from the Dead Sea (ancient)



Upright traditional Loom



Linen weaving styles today based on historical pieces



High consistent quality - Iceland  
Bale of scutched water retted flax.

## Personal Historic Interest - The Norsemen and Linen

### **Flax of the Vikings**

When the Vikings settled in Iceland more than one thousand years ago they brought with them knowledge of flax cultivation, from various parts of the world. Evidence is found in the Sagas that flax was grown on Viking farms in some parts of Iceland and evidently the fiber was used for clothing. However, centuries passed without any mentioning of this activity in the Icelandic history. Cultivation trials were made again in the 1950's but it's not until four years ago that new systematic trials started with agricultural and industrial activity in mind.



A Flax field in South Iceland.



Water retted flax for quality textiles,  
Light beige in colour and typical dew-retted flax.

Linen, a natural product, results from the interaction of sun, rain, soil and the flax plant. Just as the growing flax plant requires nurturing, finished linen products respond to "tender loving care" to preserve their quality. Not all Linen is alike!

### Caring for Linen

Maintaining the beauty of pure linen can be done either by laundering the linen item or by dry cleaning it. **Most important is to follow the care instructions supplied by the manufacturer.** These instructions, whether for laundering or dry-cleaning, take into account many unknowns, such as the pre-shrinking, threads and trimmings, dyes used, treatments for crease or stain resistance, tightness of weave and construction of the textile.

### Laundering

Many people prefer to launder linen because the more it is washed, the softer and more luminous it becomes. That luminous quality is caused by nodes on the flax fibers, which reflect light. It is also known that linen launders beautifully. Garments worn close to the body are easily washed. Freshly washed linen has a naturally clean fragrance and gives you a sense of well-being. In the case of hand or machine washing use a sufficient amount of water as linen is very absorbent.

You can line dry, machine dry or roll in terry towels. Whatever method you use, remember to remove your linen while still damp. If linen dries thoroughly, it becomes brittle and takes several hours to recover its natural moisture and full flexibility. (The natural moisture content of linen is between 6-8%. Linen dried beyond this point will have to re-absorb moisture from the air.)

Use pure soap or gentle detergent when laundering linen. Soap works best in soft water. Launder any stains when fresh. Use oxygen-type bleach for white linen, instead of chlorine bleach which can cause yellowing.

Select a water temperature between warm to hot depending on care instructions. Rinse the linen item with lots of water to remove all soap, detergent and residual soil. This will help reduce formation of "age spots" which are caused by oxidation of cellulose (linen's primary component)

Avoid wringing out linen before drying. To keep white linens white, try drying them in the sun.

### Ironing

Ironing linen is not a chore if you do it when the linen is damp. Store linen items in a plastic bag in the fridge or freezer for 6 to 12 hours before ironing, this will make them easier to iron and will prevent mildew if you can't iron them immediately.

Steam ironing dry linen is less effective than ironing dampened linens. The steam from a household iron is just not enough.

Make certain the soleplate of your iron is clean and smooth, and check for mineral deposits if you have a steam iron as these can cause brown spotting. Check your ironing board and cover, for the best ironing use a well padded board and smooth heat reflective covers.

Iron on the wrong side first, then on the right side to bring out the sheen. Iron dark linens on the wrong side only.

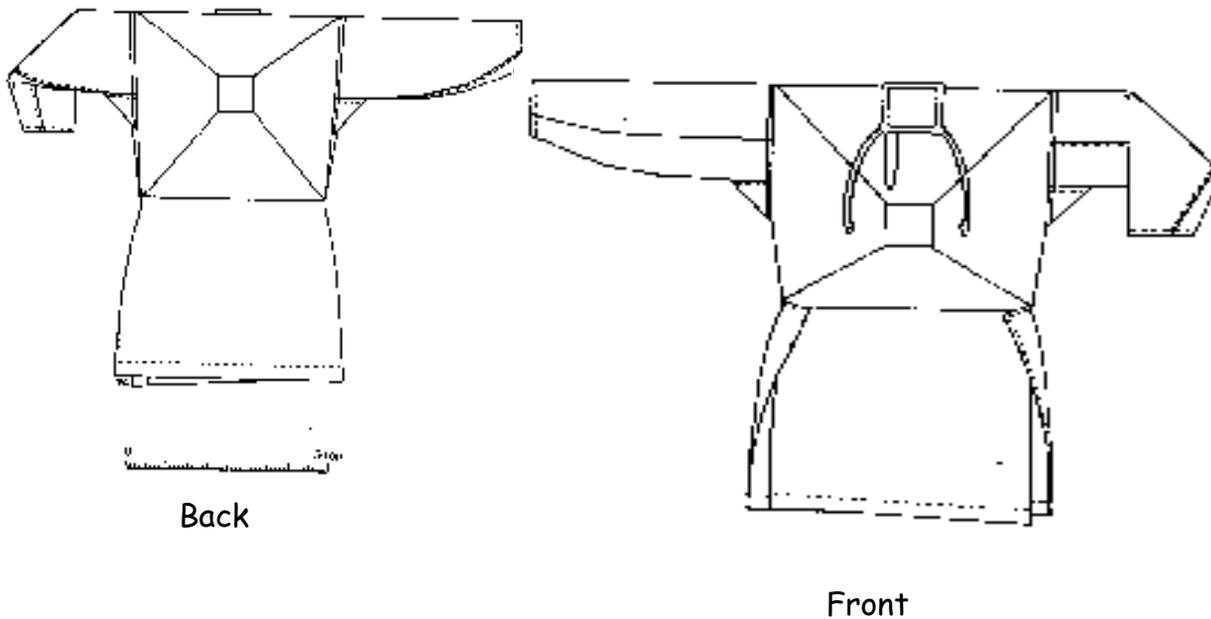
Choose a temperature setting compatible with the fabric weight. Pure linen can take the highest temperature setting on your iron. (Test an inconspicuous corner or scrap first.)

Iron linen till smooth but not dry. Once wrinkles are gone, hand the linen item until it is bone dry.

### Dry Cleaning

If linen is a natural fiber fabric and can be washed - why dry clean? Through the ages people have washed linen in streams and boiled linen in pots to get it clean, then they simply spread the linen out to dry in the sun. Remember - it is the finishes, etc., on the linen that need care following instructions.

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Reconstruction of the Viborg Linen shirt - Denmark 1100 AD approx.

This linen shirt, or tunic, is from 11th century Viborg, Denmark. The body was made from one piece of fabric, and lined with the same fabric from shoulder to waist, both in front and back.

According to experts, linen material woven to medium quality requires a horizontal loom which was known in Europe at the time and archaeologically documented from the 10th century in Poland and at Haithabu. The Søndersø finds in general attest to professional artisans and some to cultural contacts with West and Central Europe; it is thus likely that the horizontal loom was known in Viborg and that the shirt was made there, possibly from flax grown elsewhere.

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