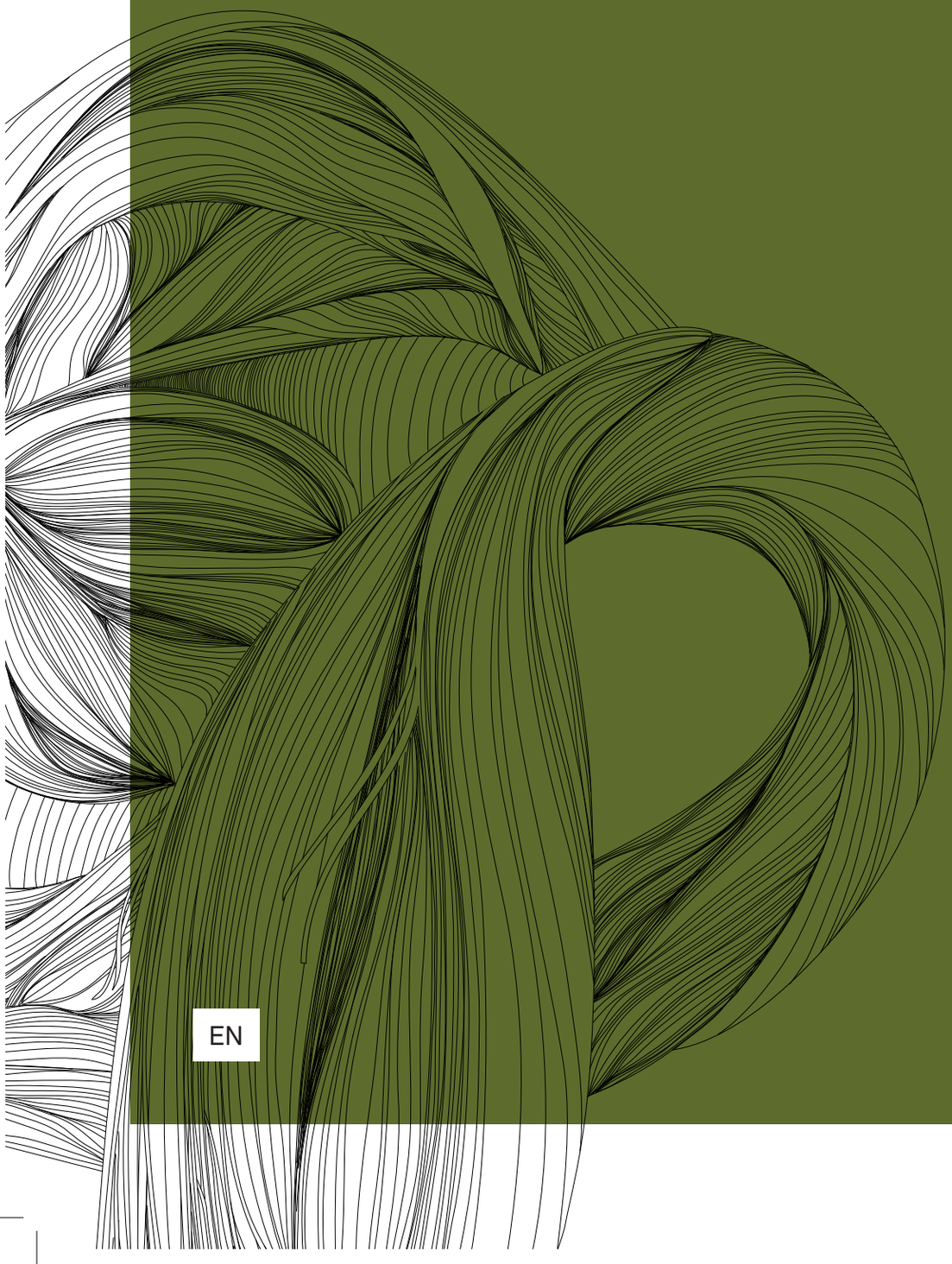
Linen Timeline



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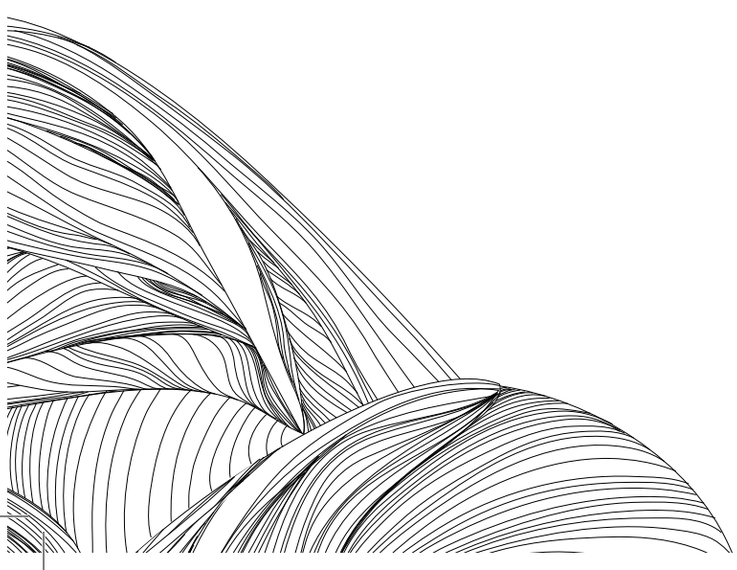
CELC
EUROPEAN CONFEDERATION OF FLAX AND HEMP

The status of linen, the first plant-based textile fiber which has been clothing humanity for 38,000 years[1], has evolved over the centuries. As the fiber of civilization, it has given rise to clothing traditions, with historical facts running parallel to epic tales and popular legends. As the fiber of creation, it is free of seasonal conventions, omnipresent on catwalks, and particularly valued in our wardrobes. As a vector for innovation, today it has moved the fashion industry down the path towards a green bioeconomy. The history of linen takes us through these chapters, showcasing the stylistic, symbolic, artisanal, and technical aspects of our human adventure. What a powerful story, especially given the fact that flax - the plant and fiber origin of linen yarn and fabric - accounts for just 0.4% of textile fibers worldwide!



A plant with European roots

A sensual fiber, it is first seen and felt. The flax plant's life cycle from seeding in March or April to maturity, when it flowers, is only 100 days. Its flowers are transitory, opening in the morning and living but one day, yet not all of them bloom at once. Thus, fields become covered with shades of sky blue, a sea of waves that starts out in the Pays de Caux, by the blue English Channel, stretching to Hauts-de-France, crossing French and Belgian Flanders and reaching Amsterdam. 95% of flax around the world is grown in Western Europe (France, Belgium, Netherlands), where 124,000 hectares and 171,000 tons of long fiber were scutched in 2018[2]. France is the largest producer in the world. The Impressionists were deeply attached to linen and depicted it in their work. Their innovative technique was possible thanks to an invention made by Flemish artists in the 17th century: painting on oil and canvas, both of which were made of flax. Although the flax flower has no scent, flax straw, sun-dried in the fields during retting, evokes memories of cut hay. The first natural step of transforming the flax plant into fiber is alternating rain and sun, which promotes the retting process in swathed flax on the ground. Retting destroys pectin, the natural glue binding together the textile fibers around the woody stalk of the liber plant. This is an entirely natural process. Once retting is complete, the swaths are rolled into bales, which must be done quickly, as an extra day of dew could alter the quality of the fibers. The bales are then stored in preparation for scutching and the mechanical extraction of the fibers.

In this kind of farming schedule, where each plot of flax is unique, the role of the farmer-scutcher pair is of paramount importance. Each movement, each decision of theirs contributes to a successful harvest. Their work is repetitive yet never the same: the rotation period of flax is 7 years, helping to increase yields without exhausting the resources of the land.

Linen, an ecofriendly material

It is an exemplary green European agricultural resource, as it is grown without irrigation[3], creates zero waste, does not contain GMOs, and has very few inputs. Local rainfall is sufficient, creating the right conditions on the loamy coastal strip of land stretching from Caen to Amsterdam. As a source of support for ecosystems and biodiversity, flax is extremely useful in preparing soil for future crops. The flax crop, which cannot be disassociated from local know-how, creates a tightly knit social fabric and long-term employment opportunities. 90% of its production is geared towards fashion, decoration, and lifestyle, but is now shifting gears towards a different future, one of bio-based, high-performance composites.

Flax, a fiber of invention(s) and a laboratory of ideas

Leaping forward on the timeline of material history, it took less than a decade for flax fibers to contribute to the rebirth of a changing textile industry. Thanks to their outstanding environmental performance and mechanical properties, technical textiles have also opened up new uses. Flax's low density, lightness, specific stiffness which is higher than that of fiberglass, and ability to absorb vibrations have thrust it into new, unexpected domains, including the automobile industry, object design, aviation, sound and music, and sports and leisure. These qualities were noted as early as 500 BC and used to produce Alexander the Great's linothorax, armor made of 15-20 layers of linen soaked in flaxseed oil and hardened through air oxidation. Its behavior was similar to today's Kevlar, and it could block an arrow by distributing the force of the impact.

While hemp has also successfully positioned itself in the composite industry, this cousin of linen, a liber plant as well, is also being used in bioconstruction: it ensures perfect sound and heat insulation when made into hempcrete or hemp wool. Whether it can be transformed into a textile fiber is still a remaining challenge.

Linen, a secular fabric serving the sacred

Linen loves color, and there is no need to highlight its entire chromatic spectrum. Yet it is the color white which is at the heart of its fame and prestige. A color which is both fleeting and part of the chromatic order. The unique marriage of color and fabric uncovered a new textile, cultural, symbolic, and codified field. White linen has been used from birth to death, from the diaper to the shroud, giving rise to liturgical robes and ideas of purity, virginity, and spirituality in Europe, Asia, and Africa.

Recall how on June 2, 1953, Elizabeth II was officially crowned Queen of England at Westminster Abbey. The ceremony attracted a global audience, yet BBC cameras failed to catch one scene, as if it needed to be shielded from pagan gazes. It was when, in a gesture of humility, the new Queen put on a simple white linen dress, covering her coronation gown. A sacred uniform for a rite of passage where decorum is no longer relevant.

This legendary saga began centuries earlier. Linen was the ultimate eternal clothing for Egyptians, and the costume of Isis, the Dea linigera, or linen-clad goddess, in Ovid's Metamorphoses. As a fundamental element of the Ancient Egyptian economy, linen embodies Egyptian antiquity. During the Old Reign (around 2,500 BC), linen was the fabric of choice for the production of loincloths, worn by people from all social classes. Always solid white, loincloths changed with the fashion of the day: over 40 styles have been identified, from closed, to open in the front, to pleated and starched ones. Transparent linen fabric, which regulates temperature naturally, served to highlight the body! Linen was often treated by being soaked in a wheat starch solution, as ironing did not exist. As the clothing of eternity, the ritual fabric and strips used to encase mummies were known for their rot-proof qualities: over 300 meters would be used for an ordinary mummy, and over 1,000 for a pharaoh. Centuries later, the Shroud of Turin and its "divine" image would secure the place of linen in the pantheon of symbolic relics.

Linen, over the years

During the Gallic Wars, Julius Cesar was impressed by the quality of textiles produced in the Flemish plains (historically located on Belgian and French territory) by a population to which he referred as the Belgae. The most sought-after linen was produced by the Atrebates tribe, the ancestors of people living in the Arras region. In Celtic, they were simply referred to using the word for "flax": the Bel'ch. Gallic priests, the druids, for their part, were called the "Belhec." Linen and hemp, together with wool, were the basic textile building blocks in the Middle Ages. Linen was already known for its antibacterial properties and was worn, on the advice of Hildegard of Bingen, to guard against the Great Plague and relieve burns and wounds from the battlefield. Hemp was considered a strategic commodity given its versatility. It found its use in cords, veils, ladders, and shrouds, and helped propel European powers to naval dominance in the 17th and 18th centuries, when they were vying for control of strategic maritime passages. Colbert founded the Corderie Royale at the French naval base Arsenal de Rochefort in 1666, securing France's supply of hemp, a measure of prosperity.

In France, cities like Arras, Cambrai and Saint-Quentin became famous for their weaving. In the early 13th century, a weaver named Baptiste developed an extremely fine weaving process. The success of his fabric went beyond France's borders and was exported to Flanders, the Netherlands, Italy, Spain, and England. Extremely delicate, it became known as the "fabric of kings" and was used to produce items such as table linen, household linen, and handkerchiefs. It was called batiste and was also known as linon or toilette (small, thin fabric). During the Grand Siècle in the 17th century, many a flirtatious dandy's wardrobe was adorned with linen: linen undergarments made their debut, showcasing lace and delicate finish. In 1685, linen became the affair of the state. When the Edict of Nantes was revoked, over 6,000 protestant weavers and lacemakers fled to the Netherlands, Switzerland, Germany, England and Ireland, disseminating their linen know-how throughout Europe.

Linen, an intimate fabric

Its intimacy is anchored in etymology, the study of the origin of words. The word "linen" originates from the Latin linum and has greatly impacted the lexicon of Western cultures. Linum, an adjective meaning "of linen," has given rise to two nouns. The first is "linen thread," which then created "line," "lineage," "longilineal," etc., as if to remind us of the uniqueness of linen, a premier long thread. The second is "linen canvas," bringing about "linen" and "lingerie." The intimacy of linen is reinforced by its inextricable link to the concepts of hygiene and cleanliness, freshness, and well-being. As a breathable, absorptive fabric that allows moisture to pass through, linen is perfect for athleisure, casual wear (e.g. polo shirts, sweatshirts), active wear, and health products (e.g. compression stockings). Linen's ability to ventilate and insulate increases its temperature-regulating capacity and makes it suitable for wardrobes in any season[4]. The intimacy of linen is manifested in various mixes and hybrids, such as the linen-leather combination key to the saddle stitches used by manufacturers of luxury leather goods.

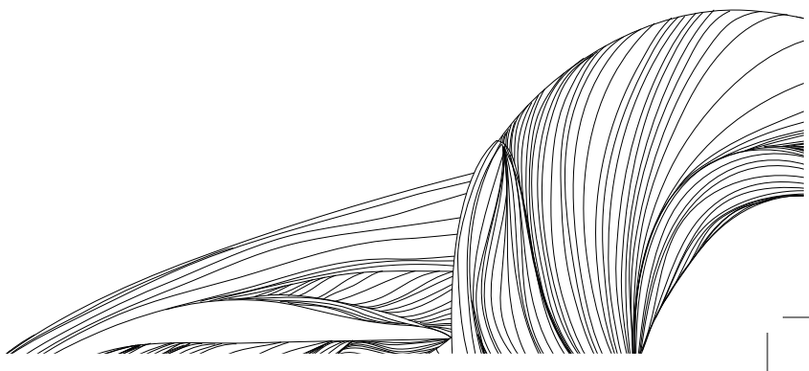
A model fabric

Christian Dior wrote that "linen is to the couturier what marble is to the sculptor, a noble material." A source of inspiration for all types of fashion artists, from high fashion to luxury ready-to-wear, to small niche brands, linen is represented in their collections. Linen likes to flirt with luxury. Traditionally the material of sewing patterns in fashion houses, linen is used by men's tailors on Savile Row to prepare suits even more tailored than bespoke suits. A highly desirable fabric, linen is at the interface between social expectations and responsible marketing. It is present on catwalks and attracts customers to boutique stores, where it showcases its creative spectrum: coarse weaves, embroidered linen, diaphanous veils, iridescent coatings, sheer lace, and more. Let us zoom in on these last innovations. A sensual, wrinkle-free linen mesh was designed by Portuguese, Italian, and French knitters thanks to dedicated R&D, and linen yarn that was thin and regular enough for jersey knitting machines was developed. This is a recent economic development, which appeared only after the 2000s, yet which gives rise to a quarter of today's linen textiles in ready-to-wear. In the domain of the home, let us not forget washed linen sheets, which have eliminated the need for ironing, a very labor-intensive step.

A ubiquitous fabric

Try touching linen. Would you not say that it has a particular feel, which you can recognize with your eyes closed? It is both dense and fluid, heavy or airy, silky or rough, depending on the situation... Its resistance and durability render it seductive and attractive. Was it not our grandmothers' treasured possession for centuries? A beloved item that should be passed down? Today, technical progress and the expertise of European spinn ers and weavers have turned linen into a modern fabric, shaped by our use. A fabric which is ubiquitous, present in every fashion, lifestyle, and interior design collection. A fabric which is a medium used by weavers and master dyers to express their creativity, juggling natural dyes such as pastel, indigo, madder, and other minerals over the years. They have created infinite color palettes, preserved in their dense and vibrant form, maturing over time, thanks to high-quality linen fabric.
Natural, ethical, traceable. Innovation and sustainable development. Local and renewable resources. These words, part of the linen lexicon, exemplify consumers' expectations in a globalized market, where transparency, responsibility, and eco-friendliness have become indispensable signs of quality. These values embody a new field of expression and expertise that is being taken into account by CELC, the European Confederation of Flax and Hemp, which unites the linen sectors in agriculture and industry, in its work on awareness-raising and professional and public initiatives.
Two certifications attest to the CELC's commitment: European Flax®, which certifies the European origin of a premium-quality fiber for all markets; and Masters of Linen®, a registered trademark and textile club of excellence, which certifies traceability when the latter is upheld by European companies at all stages, up to the production of yarn and fabric. These certifications are guiding the new international linen pathways, and Europe, as the center of linen production, is continuing to be a trendsetter.

[1] In September 2009, a team of researchers affiliated with the Institute of Paleobiology at the National Museum of Georgia discovered over 700 microscopic flax fibers in the Dzudzuana Cave. Some of these fibers had been dyed, and others showed signs of twisting, indicating that they were used to make string.
[2] Source: CELC, 2019.
[3] 99,9% certified by CELC.
[4] The study "Linen, comfort, and performance" by Cetelor Laboratory at the University of Lorraine.



Linen: the 10 stages

from field to fashion

1 Seeding

The flax plant reaches maturity 100 days after seeding and grows 80 cm to 1 meter tall.

2 Blooming

June is the month for flax. Although each flax flower blooms for only a few hours, not all the flowers in a field blossom on the same day.

3 Pulling

Linen is not cut. Instead, it is pulled up in order to maintain the continuity of the flax fibers in the stems. The fibers are then arranged on the ground in swaths, layers of flax about one meter wide.

4 Retting on the ground

It is the first 100% natural step of transforming the flax plant into fiber. Rainfall, dew and sunlight help microorganisms in the soil eliminate pectose, which binds together the textile fibers and the woody stem. In order to ensure uniform retting, the swaths are turned halfway through the process, and then collected in the form of bales.

5 Scutching

The outer layer of the stem contains the flax fibers. In order to use them, they must be extracted and separated from the woody part of the stem (shives). Scutching is a mechanical process that can be performed year-round and which involves all parts of the plant (long fibers, short fibers, seeds, etc.)

6 Hackling

The fibers are aligned parallel to one another, calibrated, and stretched into slivers for spinning. Hackled slivers of flax from different plots of land, soil, regions, and even harvests are mixed together. The goal of this process, comparable to the blending of champagne and cognac, is to produce a homogenous thread of consistent quality using the properties of each separate batch.

7 Spinning

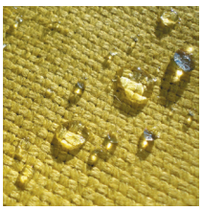
Adjusted and stretched, what then becomes strands of flax are spun through twisting. Wet spinning, involving immersion in hot water at 60°, smooths out the fibers and creates thin thread for clothing or household linen. Dry spinning leads to rougher thread, used in furnishings, string, etc.

8 Weaving

It consists of crossing warp threads (which run along the length) with weft threads (which run side-to-side). Numerous weaves, of varying thicknesses and characteristics, produce a number of creative effects: twill (denim), chevron patterns, satin, velvet, etc.

9 Knitting

It makes for a flexible, elastic, and wrinkle-resistant linen. Mesh or jersey fabric is knitted on circular machines and then cut and sewn together for collections of t-shirts, tops, etc. The “knitting” is actually performed on flat bed machines that produce pieces of different shapes, ready for assembly, or seamless pieces in 3D.



10 Ennobling

It is the process of changing the appearance and performance of the fabric: water-repellent/waterproof linen for fashion and outdoor decor, fire-retardant linen to satisfy hotel requirements, eco-friendly treatments.

Linen Timeline

Main dates in History

36000 BC

36,000 years BC | Flax was the first textile produced by man and discovered in a cave in Caucasia.

Cotton is already in use in Mexico.

5000 BC

5,000 years BC | Flax farming and weaving are fundamental to the pharaohs' economy.

Man produces the first glass in Mesopotamia, Syria and Egypt.

3000 BC

3,000 years BC | The phoenicians export linen to Scotland, Persia, India and China.

The world's first porcelain is produced in China and dates back to the Tang Dynasty.

356-323 BC

356-323 BC | Alexander the Great used linothorax, armor made of 15-20 layers of linen soaked in flaxseed oil and hardened through air oxidation. This was the world's first composite.

58-52BC

58-52 BC | During the Gallic Wars, Julius Caesar was impressed by the quality of textiles produced in the Flemish plains by a population to which he referred as the Belgae. The most sought-after linen was produced by the Atrebates tribe, the ancestors of people living in the Arras region.

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789

789 | Charlemagne gives the first directive to linen expansion: all the households must weave it.

1066

1066 | William the Conqueror seizes the crown of England: the 70 meters of linen of the Bayeux tapestry are still there to tell the story.

tapestry are still there to tell the story.

1200

13th century | "Baptiste", a weaver from the Cambrai region, developed a weaving process for making extremely delicate linen. It was named batiste in his honor.

1685

1685 | When the Edict of Nantes in France was revoked, over 6,000 protestant weavers and lacemakers fled to the Netherlands, Switzerland, Germany, England and Ireland, disseminating their linen know-how throughout Europe.

1784

1784 | Pierre Samuel du Pont gives the directive for the building of flax spinning mills in France, and then emigrates to the United States of America where his son establishes the company Dupont de Nemours.

1810

1810 | Philippe de Girard develops the flax spinning machine: the start of the industrial revolution.

1953

1953 | Elizabeth II was crowned Queen of the United Kingdom. During the ceremony, she put on a simple white linen dress, covering her coronation gown. Truly a fabric of the sacred.

The Englishman Alexander Parkes lays the foundations of the modern plastics industry when he invents parkesine, one of the very first artificial polymers.

Nylon is invented in the USA.

Polyethylene Terephtalate (PET) is patented.

2010

2010 | Thanks to the innovations of spinners and weavers, knitting and washed linen opened a new era. They bring suppleness, elasticity and a wrinkle-free added value to linen.

2012-2018

2012-2018 | CELC's reference publications co-edited with JEC GROUP for the composite industry: "Flax & Hemp Fiber Composites, a market reality - The biobased solutions for the industry."

2019

2019 | 85% of flax around the world is cultivated in Western Europe (France, Belgium, Netherlands), where 124,000 hectares and 171,000 tons of long fiber were scutched.

CELC
EUROPEAN CONFEDERATION OF FLAX AND HEMP

The European Confederation of Flax and Hemp (CELC) is the only European agro-industrial organisation federating all the stages of production and transformation of flax and hemp. Founded in 1951, it is the privileged spokesperson for 10,000 European enterprises across 14 countries, overseeing fibre development from plant to finished product.

www.europeanflax.com