ANOTHER SKIN

DIPLOMA THESIS

ANSGAR
KELLNER

“Everything is about to disappear. You’ve got to hurry up if you still want to see things.”

Paul Cézanne

The architectural envelope acts like a membrane, a skin that regulates climatic conditions and gives us a feeling of well-being. It covers the architectural structure like a garment - protecting the interior and offering comfort.

The work "Another Skin" tries to give a possible answer to the question of "Durability and/or change?" via the question of materiality.

Textile, explicitly linen, is a sustainable local raw material that can be an alternative to our static building envelopes. A thin membrane that allows a building to breathe, to sweat, in analogy to a piece of clothing - a thin layer that fits comfortably, creating a symbiosis of protection and comfort - another skin.

DIPLOMA THESIS

CHAPTERS

METAMORPHOSIS
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ANOTHER SKIN

METAMORPHOSIS

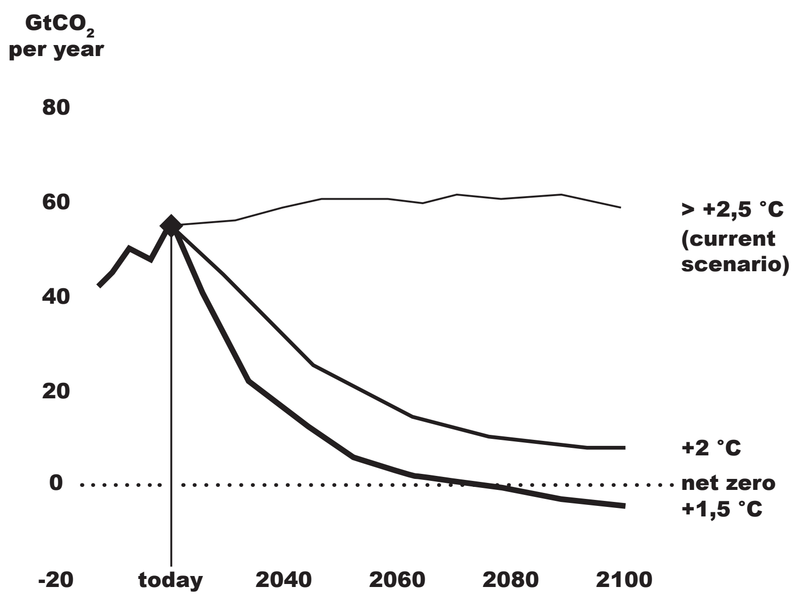
I

On Monday, 11 April 2022, a group of insulation activists called Renovate Switzerland blocked a busy motorway intersection between Lausanne and Geneva.

The group's demands may appear peculiar when people demonstrate for abortion rights or health care or simply for the right to breathe: they were calling for an immediate national action plan to insulate one million houses by 2040, justly pointing to the fact that Switzerland does not have any serious roadmap to limiting global warming to 1.5 degrees.

Guided by the best of sustainable intentions, insulation seems easy and necessary to tackle the carbon dioxide emissions from heating and cooling buildings. However, the sealing methods used in most constructions rely heavily on petroleum- and mineral-based insulating materials, undermining the benefit they offer with the harm caused earlier in their life cycles. The same is true of the bulk of materials used in architecture, whether new or renovated. At every turn, the building industry today causes damage through ubiquitous and relentless resource exploitation. Millions of tonnes of carbon are emitted annually through the energy deployed to extract, process, manus facture, transport, install and power the architecture we inhabit.

A growing public consciousness demanding accountability from politicians and polluting industries has led the construction sector to desperately seek ways out of the crisis. But this anxiety has manifested in efforts to shake off a lousy image rather than the development of serious alternative models. Because environmental destruction is not a byproduct of capitalist accumulation but is its essence, the impossibility of clean capitalism has led to the invention of 'green capitalism'. Large energy-intensive enterprises have



Net Global GHG Emissions, IPCC, 2023

constructed robust lobbying networks and successful PR campaigns to protect their polluting practices.
Scam-like emissions-trading calculations, eco-labels, re-forestation programs and other spurious offsetting policies have increased. Corporations are absolved from scrutiny without a substantial reduction of ecological and social damages while proceeding with extractive practices, labour exploitation and environmental ruin.
The climate report released by the IPCC in March 2023 emphasizes the urgency of the need for a shift in CO2 emissions.
Without a drastic reduction of CO2 emissions, the limit of a 1.5°C warming cannot be maintained. Failing to achieve this target may result in the occurrence of the “irreversible processes” described in the climate report, which cannot be excluded or prevented.

421 ppm
(May 2022)

↓

< 350 ppm
(stable atmosphere)

current global average concentration of CO2 in the atmosphere

Reducing greenhouse gas emissions to net zero is insufficient to limit global warming to 1.5°C above preindustrial levels. Active removal of CO2 from the atmosphere is also required to decrease concentration.
A potential solution to achieve this goal is to promote net-negative materials in the construction industry.

Reform

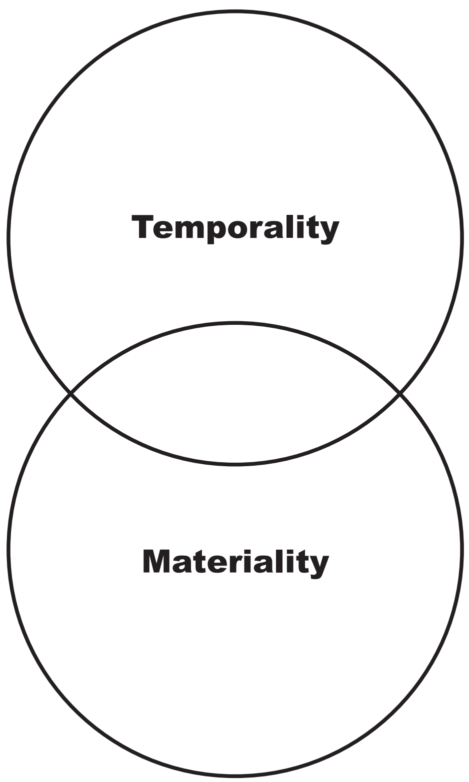
by Material Cultures: Material Reform

Whenever we build, we either contribute to or counteract dominant processes of change. It is increasingly clear that the industrialised ways of making buildings with concrete, steel, and petrochemicals that came to dominate construction in the twentieth century are changing the world in ways that are profoundly damaging, not only at the site of construction but across a vast network of sites of material extraction, processing, transportation and warehousing.

Forming genuinely new possibilities in any field, including construction, can often feel like it depends on a complete break from the conditions of the present: something akin to a revolution. Revolutions are easy to talk about, and perhaps, in an abstract sort of way, easy to imagine. But they are not so easy to start, let alone carry through. Widespread and profound shifts in ways of being and doing are rarely as sudden, cohesive or consensual as the word 'revolution' has come to imply. Revolution, in this sense, belongs to the imagination. We have to live and act in our shared material world, which is animated by ideas but not made up of them. The important thing is not to dream of a future revolution in your slippers, but to hold a vision of a radically different world in your mind while continuing to act in the world as it is, persisting in the project of making changes that are within the scope of action.
Construction is bound up with the material reality of the society it is part of, its legislative frameworks, industrial practices and supply chains. Buildings are as much designed by these preexisting conditions as they are by the designer that finalises the details of the building form. People involved in making buildings can feel trapped by these conditions, as attempts to build differently are halted at every turn by obstacles which are both practical and cultural: habit and risk aversion; standardisation and warranties; costing and specification; financing and insurances; gaps in the supply of materials, machinery or skilled workers; a lack of appetite or capacity to look after buildings that require different regimens of care. However, being involved in building means you have an opportunity to meet these obstacles and to work to overcome them, not through critical analysis but by finding practical solutions that enable work to continue.

This is not always straightforward. Working with non-standard materials sets you outside of most of the infrastructures that support and regulate construction, which means that designers and builders are held more accountable for the decisions they make. Those of us making buildings outside mainstream practices cannot outsource responsibility for the performance of a building to manufacturers, systems of standardisation and installation guidelines. The only option is for designers and builders themselves to take on significantly more responsibility and risk. Making buildings allows us to engage in a slow, determined practice of reform, finding ways to adjust and reorientate existing infrastructures, economies and technical knowledge to produce outcomes that start to demonstrate that different ways of creating and maintaining the built environment are not only necessary, but possible.

“Crepissage” Mosque of Djenné, Mali, The Architectural Review, 2010



Inevitable Transience

Nature is not static, as we sometimes hope it to be. We increasingly try to control nature and adapt its cycle to ours. The question arises whether our perception of temporality is compatible with nature. How far in advance can we plan for the future, and when are we powerless in the face of what will happen?

Architecture tries to defy the constant change in the world, to resist it with all its might. It tries to endure, often longer than it can fulfil the purpose it was initially meant to serve or before it has to give way to other changes. It becomes outdated. The question arises about the temporality that exists in architecture. What can this temporality refer to? The choice of materials for our built environment is a significant starting point for analysis.

Gottfried Semper attaches great importance to the choice of materials, defining that "immortal" architecture is his goal.[1] An opinion whose validity is questionable. Is architecture completed with its construction, and can eternity be a higher goal than the cycle of nature?

> ***"The time that passes over architecture is the time of change, weathering, erosion, and disasters. Therefore, every architecture is temporal; its temporality is its vulnerability, its inevitable transience. Architecture is not immutable but an object that changes over time, ages, and disappears. Architecture is transient like nature; it is part of the cycle of life."*** [2]

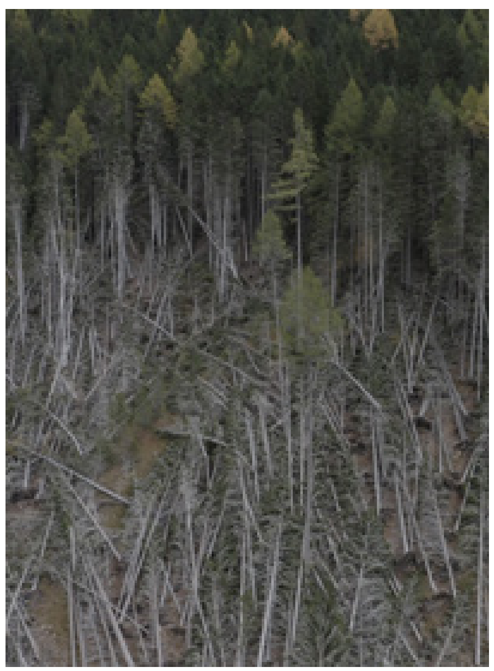
In his book "The Aesthetics of Disappearance" (1989), Paul Virilio mentions architecture and its transience. He describes it as an object that does not stoically maintain its form and appearance but is subject to a changing process.

These two views provide different insights into the materiality of architecture: the temporally

1 Der Stil 1, Gottfried Semper, 1860
2 Paul Virilio, The aesthetics of disappearance 1989

A

B



A Deforestation, Cambio, Formafantasma, 2022
B Death of forests, Cambio, Formafantasma, 2022

enduring and the temporally changing material that can be easily returned to the cycle of nature.

Which materials are suitable for current architecture and can provide an answer to the climate report? Is building with wood already the solution, as it is a naturally renewable resource?

Forests are one of the largest carbon storage reservoirs in their biomass and soil. Storing these amounts of carbon requires time, a cycle much slower than that of our building culture. Therefore, using wood in the building industry does not guarantee the raw material's climate-friendliness.
The steadily increasing demand for wood is becoming increasingly problematic. It is already much higher than can be grown and continues to increase.

The question of temporality arises again. Alternatives must be found that follow a different temporal cycle. Annual renewable plants can replace the consumption of other building materials partially. The seasonally stored CO_2 can be secured by interrupting the carbon cycle before its return to the atmosphere and remaining bound in building materials.

Luzerner Neueste Nachrichten, Bruno Voser 1987

Metarmorphosis

Nature's constant evolution serves as a powerful reminder of its transformation. With the planet being severely affected by climate change, it is necessary to reconsider our relationship with the natural and built environment.

As a discipline that shapes the physical world, architecture must move towards a sustainable and resilient future. Rather than viewing buildings as disposable and replaceable objects, we must think of them with a new perspective, considering the impact of climate change on the built environment. This calls for a shift towards adaptable and flexible structures that can withstand the challenges of a changing environment.

We must embrace nature's transformation and strive to create buildings that align with the rhythm of the seasons, the cycles of life, and the delicate balance of ecosystems.

LINUM USITATISSIMUM

III

Swiss Textile Industry

A

The textile industry is one of the oldest in Switzerland, as in the rest of Europe. Textile crafts preceded it, and spinning and later weaving were among the activities of peasant households. With the increase in population from the 15th century onwards, it became the secondary source of income for the poor rural population, namely homework on behalf of urban and rural weavers.

The increasing demand for textile products for domestic consumption or export from the end of the 16th century forced changes in production methods, leading to the mass production of textile goods. The 17th and 18th centuries manufactory established itself as the factory's forerunner by spatially centralizing production. At the same time, the cottage industry consisted of decentralized commercial production by homeworkers working at home in their parlours.

The Swiss textile industry employed thousands of entrepreneurs and workers, with 5% in manufactories and 95% in homework.
The cultivation of flax fibre and the subsequent processing of linen formed the most important branch of the textile industry until the 18th century, when cotton processing overtook it. Switzerland became the largest exporter of linen goods in Europe due to the quality of Swiss linen.

However, the introduction of cotton processing made it difficult for local flax fibre production to compete with the cheaply imported cotton fibres. Consequently, the locally based textile industry experienced a significant decrease. In the 20th century, flax experienced a resurgence in Switzerland due to a shift towards a more sustainable and environmentally conscious approach to agriculture.

B

A Weavers, Appenzell, Johannes Schiess, 1830
B Extraction of flax fibres, St. Gallen, 1860

A

B

A Mummy, Egypt, ca. 400 B.C.–100 A.D.
B Alexander the Great wearing a linothorax, Mosaic, Pompeii, ca. 100 BC

Flax

Flax has a long and important history. It is believed to have been cultivated in the Middle East as early as 8000 B.C. It was later grown in many other regions, including Europe, Asia, and North America.

In ancient times, flax was highly valued for its fibre and used to make high-quality linen cloth. In Egypt, flax was considered a sacred crop. The fibre was used for clothing, bedding, and even mummification shrouds. Making linen from flax was a highly skilled and labour-intensive task. The linen produced from this process was highly valued, with the finest linen being reserved for royalty and high-ranking officials.
Flax was also used for a variety of other purposes. The seeds were used for food and for making oil, which was used for lighting and as a base for perfumes. The stalks were used for fuel and for making paper.

Until about 1800, when imported cotton began to flood textile markets, linen and wool were the main clothing fabrics for Europeans. Wool dominated outerwear and was preferred in colder climates, while linen's dirt-repelling properties made it preferred for close-fitting garments. However, the advantage of being less prone to soiling was offset by its poor dyeability, so linen was mainly processed in its natural colour for thousands of years. For modern coloured clothing, linen is less suitable, which is one reason (along with the higher price) why cotton has almost completely displaced linen in the clothing sector over the last two hundred years. However, linen is still used in small quantities to make mixed fabrics with cotton or hemp.

The production of flax fibre differs greatly from the methods used for cotton or hemp. The flax plant is pulled out of the ground with its roots during harvesting because too much damage is caused to the fibre bundles during mechanical


Flax harvest, Graubünden/CH, 1921

Linum usitatissimum

mowing. The plants are aligned parallel to the ground and dried so bacteria and fungi can penetrate the outer skin. In the presence of moisture, these microorganisms break down the accompanying substances pectin, hemicellulose, and lignin relatively quickly, making the fibre bundles easier to isolate.

This processing step, “rotting” or “retting,” is carried out with dew, cold water baths, or warm water, depending on the country and climate. The latter method takes only 3-4 days. After retting, the dried flax straw is mechanically processed and parallelized through “heckling.” Finally, spinning and weaving follow if textiles are desired.

Although linen has largely been displaced from the market by cheaper cotton, it is still used for summer dresses and workwear, depending on fashion. Summer clothing is mainly based on the fact that linen exchanges moisture easily with the surrounding air and has a cooling effect.

Linen is naturally bactericidal, antistatic, and, as mentioned above, dirt-repellent. Due to its low elasticity and high stiffness, linen fabric tends to wrinkle but has a strong performance on tensile stress. Among the dyes commonly used before World War I, indigo was particularly suitable for colouring, so linen was primarily used for blue work clothes. It also has a long tradition of being used for bookbinding. The combination of tear resistance with chemical and biological stability is also the reason for its centuries-long use as a carrier material for oil paintings.

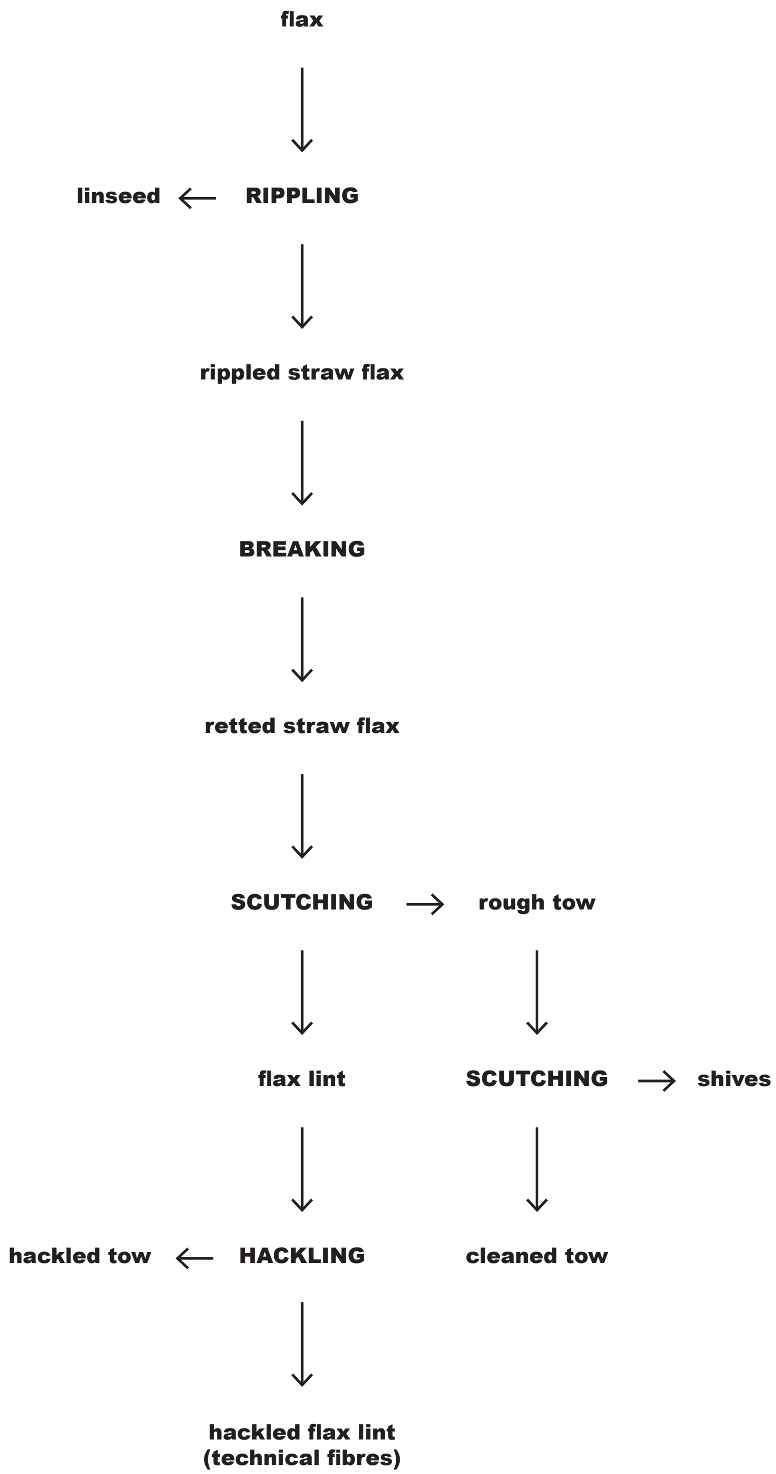
Today’s industrial applications include stuffing wool, mats, and plates that serve as heat or sound insulation. A new field of application is biodegradable composite materials. Classic composite materials consist of synthetic plastic (matrix) that is mechanically reinforced by embedding 10-40% glass fibre. Due to its low density, flax fibre is equally mechanically load-bearing per weight as glass fibre.

However, reinforcement with linen or other natural fibres has two advantages. The composite material can be returned to the pyrolysis cycle without leaving any residue, and the entire composite material is compostable if the matrix is biodegradable.

SwissFlax GmbH, 2022

Linum usitatissimum

Bleaching of linen, St. Gallen, Franz Nikolaus König, 1817



Process of flax fibre extraction

Traditional fiber manufacture

Extracting flax fibres from the flax plant is time-consuming and labour-intensive.

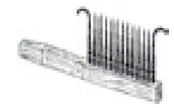
Once the plant has been harvested, the next step is to ret it, removing the pectin that binds the fibres to the stem.
After the retting process, the flax stems must be dried. For drying, the stems can either e placed in the sun or a spot with good air circulation.
Once the stems are dry, they are ready for the next step, rippling, separating the linseeds from the stem.
The separation is followed by breaking and scutching. These steps involve separating the inner core of the flax stem from the outer bark. It is done using a flax brake, consisting of a board with grooves to pull the stems. The inner core is then removed from the bark by scutching - beating the stems with a wooden tool called a scutching knife.

The final step of the process is hackling. With a so-called “hackle”, a comb-like tool with fine, sharp teeth, any remaining impurities are removed, and the long fibres are separated from the short ones. The fibres are pulled through the hackle repeatedly until they are clean of any tow. The resulting flax fibres are ready for further processing into linen fabric, paper, or rope.

Sorting flax fibres, Bündner Oberland, ca. 1905

Linum usitatissimum

Tools for fiber extraction



Ripple

Break

Scutching Sword

Hackle

Köhlers Medizinal-Pflanzen Atlas, Band 1, 1887

Linum usitatissimum

The Anatomy of Flax

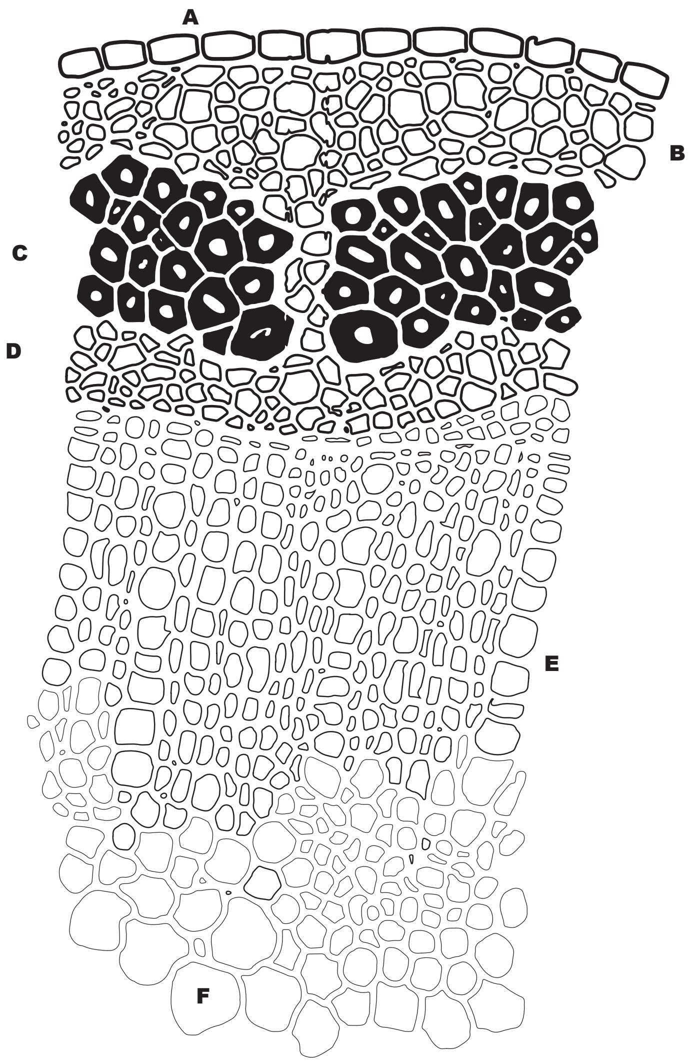
The flax plant, which is grown as both a fruit and fibre crop, has the botanical name Linum usitatissimum (Latin for “the most useful flax for consumption”), hence the names linen, lin, linen, lino, etc. Long-stemmed varieties with minimal branching and small light blue to white flowers are grown for fibre production. These “fibre flax” plants can reach 80 to 120 cm. Shorter varieties are used for extracting linseed oil from the seed capsules.

To understand the subsequent processes of fibre extraction from flax stems and the further processing into linen, knowledge of the anatomical structure of the flax stem is necessary. The microscopic cross-section of a flax stem shows the outermost layer, which serves as a protective layer for the plant. Beneath this is the cortex layer, which contains the “breathing organs,” ensuring regulated water evaporation. The fibre bundles required for flax production are located in the cortex layer: a consolidating casing made up of bast cells arranged peripherally in 20 to 50 bundled fibre strands per stem.
Cambium tissue (for growth expansion), wood and pith layers, which rupture in the mature stem to form a central hollow space, complete the well-designed structure of the flax stem by nature. These layers must be removed later to expose the flax fibre for processing into genuine linen.

The cells of flax or linen fibres consist of pure cellulose. Their “adhesive layer” (pectin or plant glue) is extremely firm, resilient, and elastic. The durability of the fibre is preserved throughout manufacturing, ensuring longevity and enhancing the quality of the final linen products.

The strength of these fibres (more resilient than any other natural fibre) ensures the high durability of linen. The high tensile strength and low intrinsic elongation are later particularly advantageous for heavily stressed fabrics such as stretched linen wall coverings or technical fabrics.

But even in washing, linen has very low wear and tear because its wet strength is even greater than its dry strength (long lifespan due to high wash resistance). Thus, flax fibre has excellent physiological properties, making it suitable and almost indispensable for a wide range of textile products. The smooth surface of linen fibres makes them resistant to dirt and especially lint-free. Despite its smooth structure, the fibre absorbs and releases moisture quickly. This hygroscopic property is particularly interesting for room climate applications. Linen is also odour-resistant and has antibacterial properties.



A Epidermis
B Cortex
C Fiber bundles
D Phloem
E Xylem
F Pith

Cross section of Flax

Sun bleaching of linenfabric

	Youngs modulus E	tensile strength UTS	elongation at break A	thermal expansion α	thermal conductivity k
Hemp	70	0.7	1.6	-	0.05
PET	10	1.1	22	-	-
Flax	80	1.4	1.2	-	0.04
Aramid	58	2.7	3.3	-2	0.05
Glasfiber	70	3.4	4.8	5	1
Carbonfiber	200	4	1.4	-1	17
	N/ mm²	N/ mm²	%	10^{-6}/ K	µm³

Hygroscopicity

Flax 35%
Cotton 7%

Fiber properties in comprison
Atlas Kunstoff + Membran, Edition Detail, 2020

Material properties

Flax fibres are gaining increasing attention as a sustainable and high-performing alternative to traditional fibres in technical applications. With their high tensile strength, stiffness, and low density, flax fibres can provide the necessary strength and structural integrity in various materials, including composites, textiles, and reinforcements.

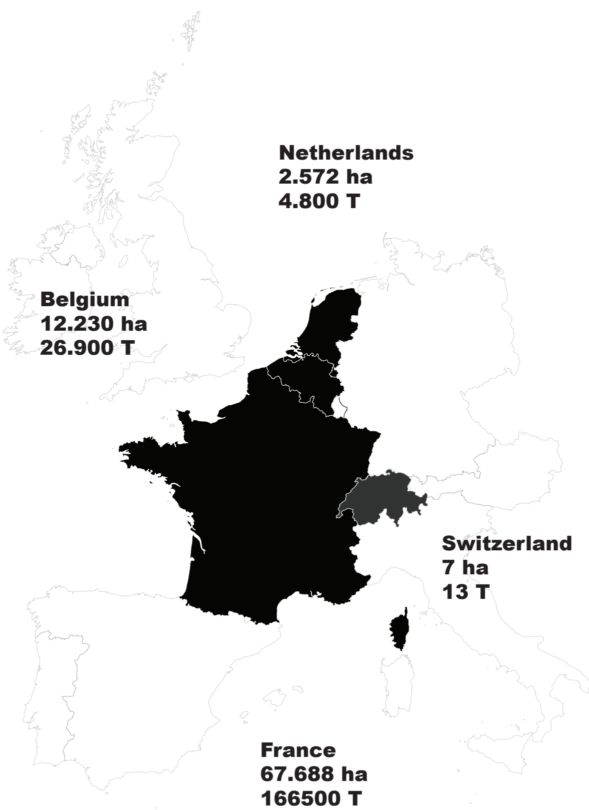
One of the main advantages of flax fibres is their sustainability. Unlike many synthetic fibres, flax fibres are biodegradable and can decompose naturally. This property makes them an attractive option for applications where environmental impact is a concern.

However, the use of flax fibres in technical applications has its challenges. One of the main issues is the variability of the fibre quality, which can depend on a range of factors, including the cultivation conditions, processing methods, and even the fibre extraction process. This variability can make it difficult to achieve consistent performance in materials made with flax fibres, which can be a concern for some applications.

Another challenge is the moisture absorption capacity of flax fibres. While this property can be beneficial in some applications, such as textiles where breathability is important, it can also make the fibres prone to swelling and weakening when exposed to moisture. This property must be considered when designing materials exposed to humid environments.

Despite these challenges, the benefits of using flax fibres in technical applications are significant. With proper quality control and management, the variability of fibre quality can be minimized, and the sustainability benefits of the fibres can be leveraged to reduce environmental impact.

80% of worldwide flax cultivation takes place in central europe



Sustainability

+ Highest cultivation conditions in Europe
+ Extremely robust plant against external environmental influence
+ No fertilizers needed
+ Crop rotation regenerates soil for the next cultivation (20-30% more productive/hectare)
+ All parts of plant are used

Material Properties

+ extremely absorbent, quickly releases moisture to the environment, hence cooling
+ UV absorbant
+ bactericidal
+ dirt-repellent
+ very tear-resistant
+ inelastic
+ recyclable

ANOTHER SKIN

II

A

B

C

D

A Scaffolding, Jan Vranowsky, 2021
B Textile UV-protection, Rhone Glacier, Stefan Schlupf, 2016

C Sir Edmund Hillary / Tenzing Norgay, Mount Everest, 1953
D Wrapped car, Deidi von Schaewen, 1983

Jil Sander Campaign SS22, 2022

Textile

Fabrics, whether artificial or natural, have changed, staked out, advanced and shaped the world we live in - from prehistoric Near Eastern and Egyptian civilizations; to the silk dragon robes of imperial China; to the Indian calico and chintz fabrics that fueled the Industrial Revolution; to the laboratory-created fibres that help people travel faster and farther than ever before. Despite today's many applications, however, textiles always retain their basic property: Protection from the external environment.

Covering the body, but also objects, buildings and nature with a textile fabric remains the most effective method of shielding them from the sun, cold or weather.

However, there is another potential in pragmatic wrapping. No one has demonstrated it as much as Christo and Jean Claude. By wrapping and cloaking buildings, monuments, and landscapes, the couple has created monumental art installations worldwide that have always sparked significant discourse.

"In all eras of art history, fabrics and weaves have fascinated artists. The structure of fabrics - draperies, pleats, curtains - is an important component of paintings, frescoes, reliefs and structures made of wood, stone or bronze, from the oldest testimonies to the art of the present. The drapery of the Reichstag with fabric panels is in this classical tradition. Fabric panels - like clothing or skin - have something delicate and sensitive about them; they illustrate the unique quality of the ephemeral." [1]

The textile texture triggers a feeling in us that we associate with comfort- the warm scarf, the soft bedspread, the cosy rug. It surrounds us like a soft shell that promises security and tranquillity. Christo and Jean Claude believed that something delicate and sensitive about textiles

1 Christo and Jeanne-Claude, 1995

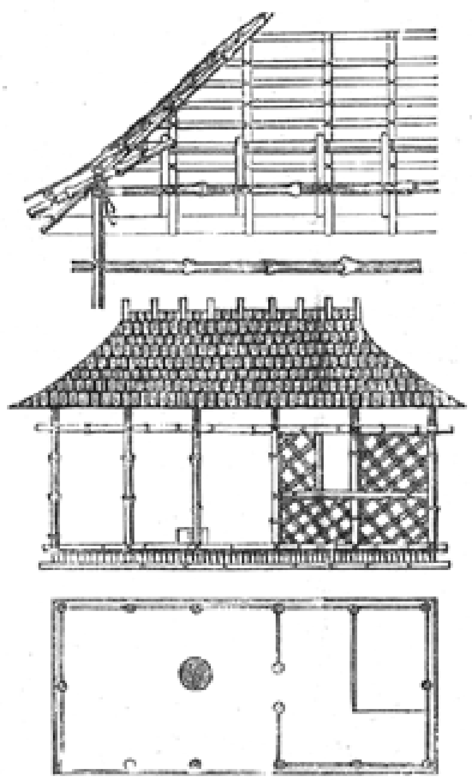
Christo and Jean-Claude, Reichstag, Berlin, Andreas Altwein, 1995

enhances the unique quality of the ephemeral. In addition to this quality, veiling also creates tension - a desire to reveal what is hidden and thus creates a certain atmosphere that invites deeper examination.

“Veiling reveals. Veiling is not an act of hiding but of emphasizing. By shrouding, we highlight, we bring to light, we reveal the structure and forms in a new and surprising way.” [2]

The symbiosis of protection and comfort makes textiles an incomparable material. It implies a softness that can create an atmosphere, which is becoming increasingly important in our current age due to political and global events.

2 Christo and Jeanne-Claude, 1995

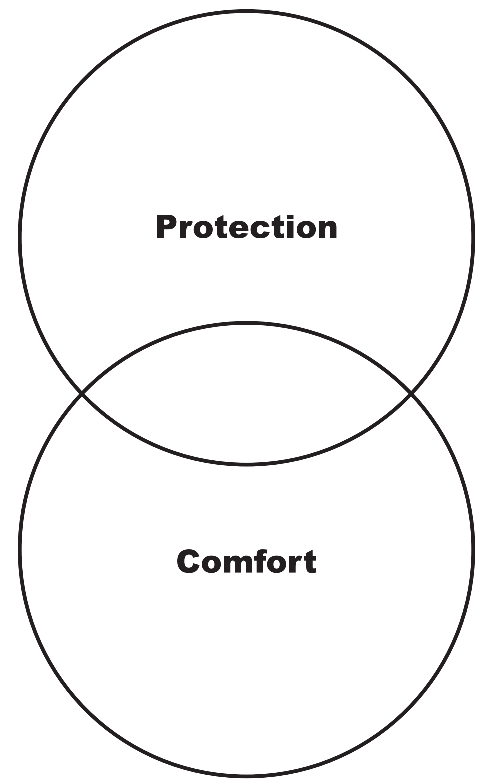


Caribean hut, Gottfreid Semper, Der Stil, 1859

“In all Germanic languages, the word ‘Wand’ (with ‘Gewand’ from the same root and with the same basic meaning) directly recalls the ancient origin and type of visible spatial enclosure.”

Gottfried Semper, Der Stil, 1859

Crisp Sheets, Campaign 2020



A

B

A Fall/Winter 21, Louis Vuitton by Virgil Abloh, 2020
A Liu Lingchao, Portable Home, 2015

The principle of dressing

Gottfried Semper researched the genealogy of architecture, which he developed from natural forms and the cultural forms that followed them. According to his thesis, even the most highly developed art forms retain memories of their origins and proximity to nature.

The first volume of his main work, The Style in the Technical and Tectonic Arts, is titled The Textile Art Considered in Itself and Relation to Architecture. He records “coverings” in plants, animals, and humans. The “skin” of trees, animals, and humans and the connection of their parts by seams led Semper to the idea of primal materials and their processing, which remain recognizable even in their most advanced forms. For Semper, textile building materials are the precursors of all other building materials.

During his studies at ancient archaeological sites, he finds evidence of the high proportion of textile fabrics in massive buildings.
Linen fabrics, highly valued in antiquity as “woven air” and “woven mist,” represent for him the ephemeral, which, transferred from textiles to architecture, makes human culture tolerable for nature.

He believes that the beginnings of building coincide with the beginnings of weaving and that the basic motif of textile art is the rhythmic series of knots. The knot is primarily a means of connection, and its arrangement creates the network as a knot structure, the fabric felt and weave - materials for dressing both the human body and the building body.

Is the spatial boundary surrounding us just another part of the membrane protecting our body? A third skin?

Bedouine men, coverered in traditional sun protective clothing, Arnold Heim, 1974

Another skin

The skin can be compared to a stretchable, dense container surrounding the body. It protects against dehydration and regulates the water balance. It is a sensory organ: the nerves end in the skin, detecting stimuli.

A sensor is a receptor that reports what is happening on the surface. It reports pain, pressure, and touch.
It can absorb and release caloric energy and contributes significantly to a balanced body's heat balance.

The skin is an obstacle. It protects the body from external forces. It is a gentle resistance. Its share of immunological cells enables the skin to defend against invaders. Its outer appearance may indicate to the social environment what is happening internally. The skin blushes, the face turns pale, and the hair stands on end.
Extremely sensitive, it shows heat and cold. The skin provides the medicine man with information about where the problem may lie; it is of medical interest and contributes to the symptoms of general diseases.

Understanding architecture as a further skin of the human being is also found in other theories. Hundertwasser describes his house, after textile clothing, as the third skin around his human body.

Similar to human skin and clothing, the building envelope also has several functions to fulfil: it is protection and filter, it repels, it holds back, it opens up, and it regulates.

The boundary layer of a building separates two spheres of different natures. Its function is to maintain the necessary energetic or social difference between two spheres, zones, or areas. Its nature allows for an exchange between an inside and an outside.1

1 Transfer, Peter Erni, Martin Huwiler, Christophe Marchand, 1999

A reactive building envelope - acting as an interface between two energy spheres and changing its properties according to the energetic and social context conditions - can coordinate the inflows and outflows of an enclosed volume so that optimal indoor climate, both physical and psychological, is ensured.

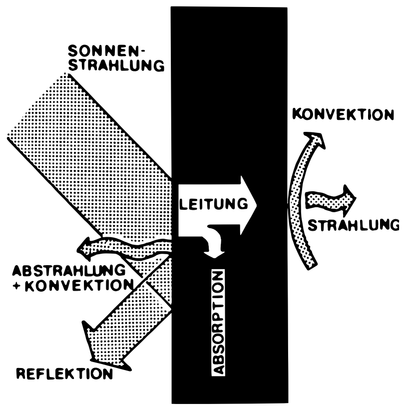
A reactive building envelope should be considered an intermediary, mediating between humans and nature.

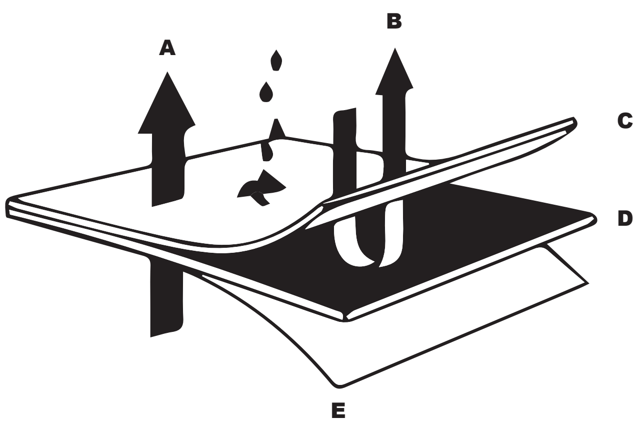
Protection, refuge, shelter, hiding place, cosiness: it is conceivable to regard the enclosed space and everything it requires as a responsive organism whose constituent elements, such as the envelope, can harmonise internal and external conditions.

It regulates the well-being inside through a polyvalent skin.

B

B Men´s five skins, Hundertwasser, 1997





A breathable
B windproof
C outer fabric
D membrane
E lining

A Building envelope
B Membrane diagram

Membrane

The question of the nature of this envelope, and its structure, inevitably arises.
Is it a multifunctional, omnipotent skin, a membrane found in cell structure, which would probably be a product that could no longer be returned to the natural cycle? Or is it a multi-layer principle, where each layer takes on a specific function? Ensuring a certain level of purity in the material allows for easy changes to be made and for the materials to be recycled effectively. [1]

Nomadic architecture often utilizes textiles in the construction of tents. Textiles largely disappeared from the outside in modern architecture, where they continued to be used for their texture and sensuality in the interior.

Architecture always tries to emphasize the materiality of the materials used. The use of textiles, this is usually different in modern architecture. There is always an attempt to avoid folds and gathers, which results in the character and one of the essential qualities of textiles being lost.

1 Werner Sobek, in Das leichte Haus, Walter Scheiffele, 2015

Model, Another Skin, 2023

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PROFESSORS
ANNE HOLTROP
GÜNTHER VOGT