

Atelier Luma Algae Review

ALGAE SUMMIT

The Algae Summit, due to be held during the 4th edition of the Luma Days on May 27 & 28, 2020 has been postponed (dates to be confirmed). The decision comes as a result of the disruption caused by the ongoing Covid-19 pandemic. This extraordinary situation is giving us the chance to (re)think about the world we live in. The team of Atelier Luma is working on a new proposal for the Algae Summit that better reflects on these times of great change and upheaval as this will be crucial for our future.

We would like to thank everyone who applied to the Open Call, Pecha Kucha sessions and who committed to contributing to the Algae Summit! We are willing to pursue the discussions and find new ways to feed our platform for knowledge exchange. We, therefore, invite you to continue sharing your experience, ideas, and opinions. To contact us: algaeplatform@luma-arles.org

ATELIER LUMA ALGAE REVIEW *Everything you always wanted to know about algae*

The algae monthly review is a curated newsletter dedicated to algae knowledge and Atelier Luma's Algae Platform activities. By mapping existing algae knowledge — from literature to scientific research — Atelier Luma aims at consolidating a community of international algae practitioners, creatives and experts to actively participate in the research, understanding and valorization of algae resources.

“The shore is an ancient world, for as long as there has been an earth and sea there has been this place of the meeting of land and water. Yet it is a world that keeps alive the sense of continuing creation and of the relentless drive of life. Each time that I enter it, I gain some new awareness of its beauty and its deeper meanings, sensing that intricate fabric of life by which one creature is linked with another, and each with its surroundings.”

— Rachel Carson, *The Edge of the Sea*, 1955

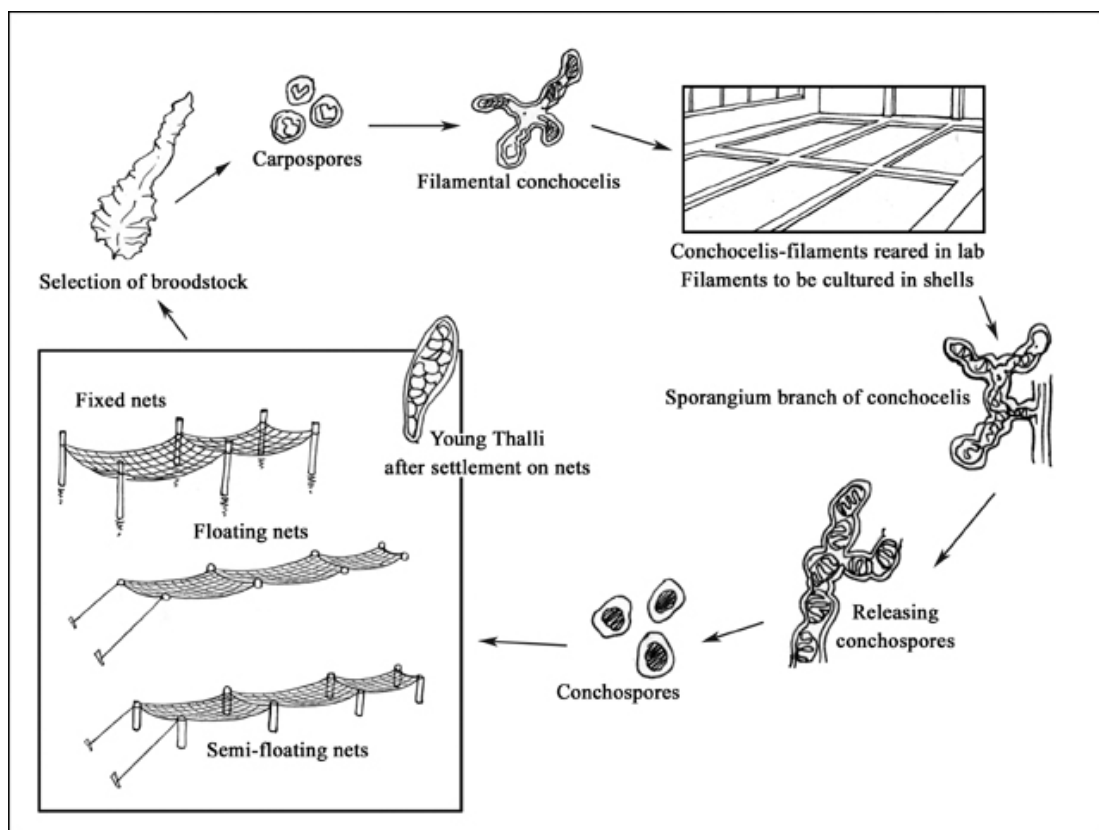
WOMEN & ALGAE

The study of the history of algae and its uses is intertwined with the often invisible stories of women. It is not without recalling the emergence, in the 1980s in the United States, of the ecofeminist movement, an encounter between feminism and nature. This edition is therefore devoted to portraits of female scientists, farmers and ecological activists who have contributed and continue to contribute to the valorization of algae.

THE HIDDEN STORY OF THE NORI SEAWEED

There was a time when the traditional use of Nori in Japan was on the brink of extinction. After World War II the production of Nori, the red seaweed turned into a traditional Japanese delicacy, went through a dramatic drop in harvest after a series of natural disasters.

On the other side of the world, Kathleen Drew-Baker (1901 – 1957), a botanist and lecturer at the University of Manchester was studying algae. Following her marriage, the university withdrew her position since married women were not allowed into academic positions. Nonetheless, Drew-Baker pursued her work as an unpaid research fellow. She focused on a species of *Porphyra*, native to the coast of Wales and locally known as laver (it is used by locals to make bread or soup). Drew-Baker unveiled the complex and until then mysterious cycle of reproduction of the seaweed and in 1949 published her discoveries in the famous journal *Nature*. When Professor Segawa Sokichi, a Japanese marine botanist, read Drew-Baker's paper, he immediately thought the new knowledge could save the cultures of the local species of *Porphyra*, the famous Nori. Indeed, a few years later Japanese nori farmers were able to apply seeding techniques that proved efficient and that are still used



today, first growing the algae spores on shells in indoor pools before transplanting the algae onto nets in the sea.

Drew-Baker has rescued the Nori Industry as farmers turned an unpredictable crop into a stable harvest. The benefit was so valued that in 1963 a monument was built in Uto City, Japan to honour Kathleen Drew-Baker, who is known there as the Mother of the Sea.

However, climate change and rising water temperatures have posed a new threat for the Nori that grow in the cold winter waters. More perversely, recent regulations to reduce agricultural runoffs and clean up Japan’s rivers led to a decline of nutrients available in the ocean, directly impacting the cultures. It raises the question of productivity when linked to polluting activities.

SOURCES

→ **HOW AN UNPAID UK RESEARCHER SAVED THE JAPANESE SEAWEED INDUSTRY** • BY ESTHER INGLIS-ARKELL, 19 NOV 2017

→ **JAPAN’S SEAWEED INDUSTRY IS IN JEOPARDY** • BY ROBIN HARDING, 15 OCT 2019



SPIRULINA CULTURE IN CHAD, A FEMALE TRADITION

A variety of the microalgae spirulina naturally thrives in the Lake Chad area of the Republic of Chad, benefitting from the particular ecosystem of the ouadis or shallow ponds. Called Dihé, the alga has been harvested and consumed for centuries by the local Kanembu Tribe. Extremely rich in proteins, vitamins and minerals it also has antibiotics and antiseptic properties and is used as a health product.

The traditional harvesting technique is transmitted from mother to daughter. Men are forbidden from entering the water as it is believed they would render the lake barren. The spirulina taken from the surface of a pond is strained through a doum palm basket and then poured into basins made in the sand which absorb the water and dry the spirulina. Each woman can harvest about 4 to 8 kg a day which represents a crucial source of income.

Compared to the growing quantities of spirulina produced by biotech companies, the spirulina produced by the women in Tchad – one of the few naturally harvested spirulina in the world – is cheap while offering a high quality. Different projects have occurred to improve and modernise the harvesting methods and develop its commercialisation. Modernisation might be needed to supply a safe and healthy product, but it could also mean losing the traditional knowledge that is so precious for the life of the Kanembu women. Keeping the knowledge with the people is essential.

SOURCE

- [THE BLUE ALGAE OF THE DESERT](#)
- VIDEO FROM 28 SEPT 2012





RACHEL CARSON, MARINE BIOLOGIST AND PIONEER OF ECOLOGY

“The trees of the forest are the large seaweeds known as the rockweeds or sea wracks, stout of form and rubbery of texture. Here all other life exists within their shelter – a shelter so hospitable to small things needing protection from drying air, from rain, and from the surge of the running tides and the waves, that the life of these shores is incredibly abundant.”

— *Rachel Carson, The Edge of the Sea, 1955*

Rachel Carson, a marine biologist, author and early ecologist, is most famous for her book *Silent Spring*, published in 1962, that raised awareness for the dangers of synthetic chemical pesticides and had a tremendous impact on the birth of the environmental movement in the United States and beyond. Right after its release, Carson came under fire from big industries, some scientists and governmental representatives. The criticisms were often gender biased, characterising Carson as a witch on a broomstick, and denouncing her as a hysteric and mystic. Yet, the attacks could not stop the groundbreaking influence of her book.

Carson’s exploration of the ocean’s intricate life is maybe less known. She wrote her discoveries of marine ecosystems in a series of books that also expressed her wonders at the beauty of different life forms. *The Edge of the Sea*, first thought as a field guide, gives a lyrical and poetic account of the intertidal zone in the Maine, where Carson built her summer cottage. She got enchanted by the beauty of rockweeds, the most common seaweed from the rocky intertidal zone. The luxurious rockweeds play a crucial role in sheltering a rich biodiversity.

Nowadays, rockweeds are harvested for their rich nutrients, which raises concerns about the impact for the rockweed population and the whole ecosystem. Inspired by Carson, the story map of the rocky intertidal zone in the Maine made by Katie Galletta from Bowdoin College offers a beautiful visual journal of this particular ecotone that deserves our attention and sense of wonder.

SOURCES

- **WHAT WE OWE TO RACHEL CARSON**
- **RACHEL CARSON’S CRITICS CALLED HER A WITCH**
 - BY LIVIA GERSHON, 21 FEB 2019
- **THE ROCKY INTERTIDAL ZONE OF THE GULF OF MAINE** • BY KATIE GALLETTA, 2019

WEAVING ALGAE pp. 6 – 8

By Axelle Gisserot
Textile designer at Atelier Luma

The environmental, social and cultural impact of contemporary textile production encourages creative people, scientists and historians to come together to rethink the system as a whole. From the harvest of the raw material, or its gathering, to its transformation into fibers, yarn, then fabric, including its coloring and finishing, each step is today increasingly toxic and harmful to the environment.

Many natural resources that arguably exist in excessive amounts or are problematic can be considered as raw materials for a fairer and more sustainable textile production. Algae is one of them and that I would describe as a total resource.

In designing a textile production process, I realized that algae could be used and valorized at every stage. They can be structuring, coloring and functionalising raw materials. As energy producers (bio-fuels), regenerating or purifying, they are also a unifying material, a material with a history.



This is what particularly interested the Atelier Luma Textile Lab, motivated by the presence of different species of micro-algae on the territory.

Its pigmentary characteristics—its color is as intense as it lives and evolves—and less tangible qualities: anti-oxidant, antibacterial, structuring, protective... offer a plethora of potential for skin, hygiene, clothing, or for indoor environments such as the home.

That's how the Textile Lab started its research into the color of algae. We first sought which type of textile fiber could be favorable to the expression of the colors from the microalgae of the Camargue. Stifled by the French textile industry and long considered as a by-product of the animal—despite the essential role of pastoralism and transhumance, and the history that binds them—the Merino wool of Arles came as a foregone conclusion. This wool, the finest in Europe, sheared from sheep grazing at the gates of Arles for more than half the year, has become the raw material inherent to our research and textile prototypes.

A collaboration with Buro BELÉN studio was set up in February 2019. Research into dyeing and silk-screen printing based on the first experiments has





enabled us to identify the potential of color and its character. As a result of this joint research, a series of textile models were presented at the Milan Triennial where mosquito nets, carpets, plaids and curtains were sampled: ikat weaves, tufted dyed yarns, screen-printed fabrics, and more.

These first qualities allowed us to understand the reactions of microalgae, their specificities, the two materials being sensitive to each other: the algae offering an astonishing range of colors, and the wool generously absorbing their pigment.

Following this experience, the desire to develop an algo-sourced textile yarn based on the Algae Lab's research became more apparent. Partnerships with various research laboratories such as ENSAIT in Roubaix were set up to develop it. While waiting for the first qualities of yarn, we have explored the capacities of a 3D printing filament extruder to produce a filament made of micro-algae and bio-plastic that is suitable to upholstery fabric. Harvesting, drying, compounding, extrusion, weaving: this is the first time that the color of Carmargue micro-algae appeared in a textile filament,

woven in weft on a Merino wool warp. These textile walls were presented at the World Economic Forum in Davos.

The challenge now is to imagine a small-scale production in order to create real-world textile applications. To do this, the Textile Lab is collaborating with manufacturers, including spinning mills, weaving and knitting units, all in discussion with the research laboratories and the Algae Lab. This is where the strength of this project lies: it brings together a panel of multidisciplinary experts such as aqua-culturists, shepherds, engineers, salt workers, weavers, biologists and spinners who work together to imagine new outlets for the revalorisation of micro-algae.

Identifying unsuspected properties in algae stimulates our research on a daily basis and the results that are coming out will feed assuredly into a textile production. Their affinity with wool is already helping to revitalise the industry in the south of France. Development opportunities are multiplying and allow us to consider prototypes for in situ tests in Arles. Mosquito nets for next summer?

ARTICLE 1

Image 1: Kathleen Mary Drew Baker
© Bygone Collection, Alamy via Wikicommons

Image 2: Production cycle of Porphyra spp.
© FAO (Food and Agriculture Organization of the United States)

Image 3 & 4: Nori culture in Japan
© Yamamotoyama

ARTICLE 2

Image 1: Tchad Women drying spirulina
© sf.donntu.org

ARTICLE 3

Image 1: Rachel Carson
© Erich Hartmann / Magnum Photos

COLUMN

Image 1: Axelle Gisserot weaving Merino wool of Arles yarn dyed with spirulina
© Joana Luz

Image 2: Samples of merino fabric printed with different microalgae pigments
© Joana Luz

Image 3: “Algae loves Wool” by Atelier Luma i.c.w. Buro BELÉn, presented at Broken Nature, XXII Triennale di Milano, 2019
© Victor Picon

Image 4: Color range of biobased algae + PLA filament for woven textiles
© Joana Luz

Image 5: Textile printing ink preparation with microalgae pigments from the region at Atelier Luma
© Joana Luz

Image 6: Microalgae, bioplastic and merino wool of Arles woven panel on the loom, presented at the World Economic Forum in Davos, 2020
© Joana Luz