

CONSUMPTION

Strategies

Life takes advantage of the availability of local materials and local energies for its functioning. It assembles simple elements into complex structures, which it then recycles.

#abundance #sobriety #frugality

Using resources in a sustainable manner

Life uses the most abundant resources (CO₂, O₂, etc.) and very marginally rare resources. The use of abundant materials avoids dependence on a limited resource.

du côté des organisations

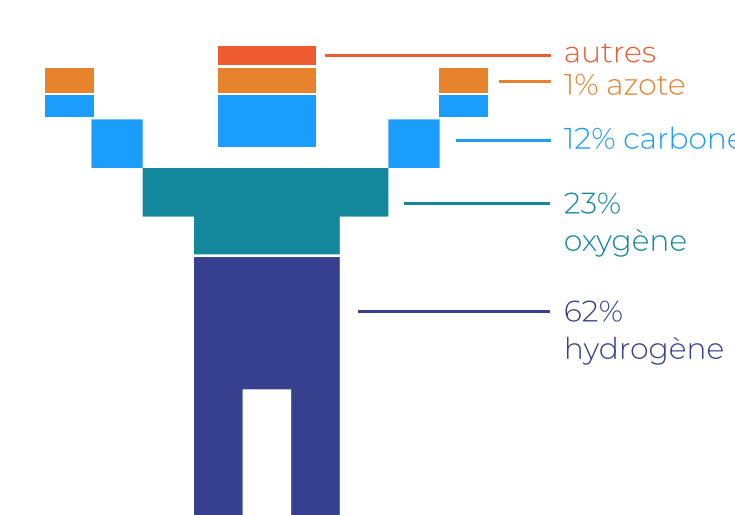
Did you know that from the 16th to the 20th century, farmers in England and the Netherlands were able to grow Mediterranean fruits and vegetables using only renewable energies? The installation of a fruit wall (a simple south-facing wall that retains heat) creates a microclimate at its base, enabling Mediterranean fruit varieties to be grown in temperate climates such as northern France, England and the Netherlands. In the meantime, we have invented heated glass greenhouses, which consume 10 to 20 times more energy than open-ground cultivation.

on the living side

Let's look at the atomic composition of the human body: 62% hydrogen, 23% oxygen, 12% carbon, 1% nitrogen, traces of calcium, phosphorus, potassium, sodium and so on.

But what are the most abundant elements in the universe? Hydrogen, helium, oxygen and carbon top the list! So we're made up of the most abundant elements in the universe, just like all living things.

These natural processes for producing living matter and information take place : at room temperature, in a solvent such as water (H₂O) using sugar... and that's it!



#zero waste #circularity

Recycling all raw materials

Waste from one organism becomes a resource for another organism. Living organisms use the most abundant atoms, facilitating the circularity of life.

du côté des organisations

The circular economy strongly supports this and offers us many examples:

Cabinetmaker Franck Grossel reuses waste from beer brewing: spent grains. And these spent grains become the raw material for his stools!

"Les chaussettes orphelines" recovers your socks with holes in them... to make new ones! But even before recycling, let's think about reducing and reusing. It's the famous 3R rule: Reduce first, if impossible Reuse what exists, otherwise Recycle.

du côté du vivant

Once fallen, tree leaves become both a waste product and a resource, turning into tannin, a highly prized food for mushrooms.

Note that in "Nature" the notion of waste does not exist. of waste does not exist, it is purely anthropic.



#elementary-bricks #emergence

Build in a elementary way

It's by starting to build simple elements in limited numbers that living organisms form more complex elements. Living organisms are built by successive additions of interlocking systems (cells -> organs -> individuals -> populations -> ecosystems -> Earth).

du côté des organisations

Today, we're witnessing a genuine revival of interest in the use of local materials in architecture. Stone, certain types of rock wood and bricks are being used extensively in the design of new buildings.

The advantages of this vernacular are numerous: reduced ecological impact, relative abundance, lower transport costs!

du côté du vivant

Every living organism is based on information encoded in what is known as DNA (deoxyribonucleic acid). Made up of 4 basic building blocks (adenine (A), cytosine (C), guanine (G) and thymine (T)), DNA "encodes" living organisms in all their inter- and intra-species diversity. We can therefore say that living organisms need only 4 elementary letters to write a novel with an incalculable number of characters over 4 billion years!



COLLECTIVES

Strategies

Every species is interdependent with other species. Thanks to ongoing collective exchanges, living organisms achieve high levels of robustness and resistance to change.

#subsidiarity #expertise

Divide the work, specialize

Certain species specialize according to their ecosystem and environment in order to adapt and survive.

— du côté des organisations —

This principle illustrates the division of labor from a technical and international point of view. Philosopher and economist Adam Smith explains that specialization generates wealth through indirect profit. This brings us back to the industrial method of work organization (OST): Taylorism. It is based on the productivist principle of division of labor. While this method democratized access to consumption through mass production, it also had a considerable impact on workers' motivation and working environment.

— du côté du vivant —

Birds' beaks are particularly well adapted to their mode of consumption (and therefore to their prey). The hummingbird's beak, for example, enables it to collect nectar from flowers, which is inaccessible to other species. This principle is double-edged. In nature, depending on environmental conditions and how they evolve, specialization can be an advantage or a disadvantage. For example, alpine species that are highly specialized to survive the cold are now suffering from climate change.



#entraide #interdependence #coopetition

Cultivating cooperation in crisis situations

The principle is simple: the focus is on the group, not the individual. This cooperation can go as far as communality and symbiosis, and is at the root of better survival strategies in a crisis!

— du côté des organisations —

Emmanuelle Joseph-Dailly, bio-inspired business consultant, talks about "coopetition", a neologism derived from the contraction of the terms "cooperation" and "competition". Coopetition refers to "collaborative competition", as exemplified, for example, by Cape Gannets and dolphins competing for sardines. Integrated into organizations, this principle changes the way we look at competitors, from an offensive strategy to a more effective and efficient alliance strategy.

— du côté du vivant —

To combat the cold, penguins gather together to keep warm, taking turns on the colder extremities.

The matsutake is a fungus that grows in hostile environments based on collaborative survival (e.g. Hiroshima). Its roots intermingle with those of trees, which supply carbon hydroxide, and it supplies the water and nutrients that enable the tree to grow. This fungus only grows in inter-species collaboration, never alone.



#multiple exchanges #self-organization

Share information and synchronize

All living systems have the remarkable ability to synchronize and transmit information in order to develop, repair or self-organize. And this applies to both organisms (e.g. trees) and ecosystems (e.g. forests)!

— du côté des organisations —

Decentralization manifests itself in new modes of governance and managerial models within organizations.

One example is Onepoint, where each employee chooses the projects he or she wants to work on personally. They then surround themselves with the competent people they need.

This horizontal system encourages employees to get in touch with each other to learn about and share their projects and skills.

— du côté du vivant —

A scout bee informs foragers of food sources. It dances to indicate the direction and distance of flowers. The flower itself, with its colors and scents, provides information to attract pollinators.

Wood wide web is a network that links the trees of a forest through thousands of kilometers of micro-connections woven between them. This network, developed by fungi, enables the coordinated exchange of information and nutrients required for development and adaptation.



#watch #interaction #flux

Closed but open to the outside

Every cell, organism and society needs to be enclosed to ensure its internal functions are otherwise impossible. But these same cells, organisms and societies must be open to receive energy, information and matter!

— du côté des organisations —

A company is a perfect illustration of this concept. It is, of course, open to the outside world, where it finds its raw materials, energy, human resources, customers and so on. But it is also a concept defined by borders: legal, geographical, social, symbolic and even service.

— du côté du vivant —

Every living being is both closed (an entity that can be dissociated from its external environment) and open (it receives external energy to maintain its metabolism). In the human body, the skin embodies this interface with the outside world, at once closed and open, providing protection (from shocks, pollution, UV rays, microbes, etc.) while enabling: thermal, to regulate body temperature; bacterial, to stimulate the body's immunological defense system.



#horizontality #interactions #holocracy

Decentralize

In nature, there's no centralizing body: on the contrary, all information is decentralized: each individual has the minimum of information at his or her disposal, and communicates with his or her neighbors through dense networks.

— du côté des organisations —

Urban planner Carlos Moreno has developed the concept of the quarter-hour city. A city model based on proximity, where residents would have access to all essential services (shopping, work, entertainment, culture, sports, healthcare) within a maximum 15-minute walk of their homes. A decentralization of services that would transform local life for city dwellers.

— du côté du vivant —

A termite mound is an earthen structure several meters high, consisting of galleries and a heat regulation system that is conducive to termite life and provides numerous ecosystem services. These entities are built without architects: only the action and interaction of the insects result in significant levels of complexity and functionality.



TEMPORAL Strategies

The living world is the culmination of 4 billion years of continuous functioning and adaptation. Observing these evolutions is an opportunity for our organizations to take advantage of cyclical short-term adaptation strategies or long-term modalities aimed at survival.

#integration #programming

Designing as a cyclical process

In keeping with the circular organization of resources, most natural processes are cyclical (days/seasons/glacial cycles). Living organisms are subject to this in their metabolisms, which are themselves adapted over the course of evolution to external cyclical processes.

— du côté des organisations —

Our organizations have largely freed themselves from natural cycles: working in 3 shifts means that companies no longer stop at night, our days follow the same rhythm, whatever the season... the weather has long since had only a tiny influence on our activities!

However, this liberation also entails risks: chronic fatigue, depression, burn-out, loss of meaning, etc. What if reconnecting with natural rhythms - and therefore considering sub-optimization - would enable us to live better, and ultimately optimize our well-being?

— du côté du vivant —

Living organisms do not benefit from cyclical processes, but are subject to them. Evolution means that it adapts to cycles that are external to it. For example, the sunflower follows the path of the sun to capture as much energy as possible, but without any intention to do so.



#evaluation

Self-repair

The living world's preventive strategies do not always protect against problematic consequences. It is then necessary to repair oneself without depending on an external agent. This is the case for a cut on our skin bark of a tree.

— du côté des organisations —

Few everyday objects have the ability to repair themselves. Could you find one?

The reparability index recently became mandatory for electrical and electronic products. Its aim is to encourage producers to design more durable objects. It's a first step towards circularity in our production chains!

— du côté du vivant —

Hevea latex contains capsules in its bark that break on contact with air when the tree is damaged. These capsules release hevein, which naturally repairs the bark thanks to its coagulant properties.

This principle of self-repair is found in most living systems, whether for organic parts (bark or skin) or mineral parts (bone).



#long time #interdependence

Ecosystem services

In ecosystems, the interactions between species and their environment generate a range of "services" useful to all: these are known as ecosystem services. Generated graciously, these services are useful to other species to other species, and even to the ecosystem as a whole

— du côté des organisations —

SSE (Social and Solidarity Economy) companies illustrate this point. In addition to producing economic value (means), these entities strive to have positive externalities on society (ends): integration, localized or global socio-economic impact...

It's a paradigm shift in the entrepreneurial world that comes close to bio-inspiration.

— du côté du vivant —

The earthworm is essential to the soil. By digging galleries, earthworms aerate and enrich the soil. They also play an essential role in transforming inert organic matter into mineral elements that can be used by plants. Two great services rendered without the worm even realizing it!

Through their root network, fungi stabilize and structure soils, preventing erosion. They also provide trees with mineral salts and residual water in the event of drought. In exchange, the trees provide sugars. Mycelia connect roots and trees to one another and promote exchanges.



#margin #anticipation #preservation

Sub-optimized

By operating naturally under-regulated or non-reactive, the body leaves itself room to maneuver, adapting to constraints and mobilizing its full potential when necessary.

— du côté des organisations —

Buurtzorg (neighborhood care) is an innovative model for home care. The company has put the patient back at the heart of the care system by investing the necessary time in each patient. An approach that challenges the logic of productivity! However, this approach has resulted in greater patient autonomy and satisfaction, fewer emergency room admissions and a greater sense of responsibility among staff. This ultimately creates long-term benefits, not least time savings for the orderlies!

— du côté du vivant —

The body's proteins and enzymes are sub-optimized (37°C) to anticipate a punctual optimum during crises (39°C 40°C). These margins for maneuver are adaptation resources.

In anthills, 20% to 30% of ants do... nothing at all. And yes, they are the anticipated reserve for potential crises.



#replication #maintenance

Maintaining integrity in renewal

It is necessary to pass on failed components from one generation to the next, or to renew them regularly. However, identity and function are preserved.

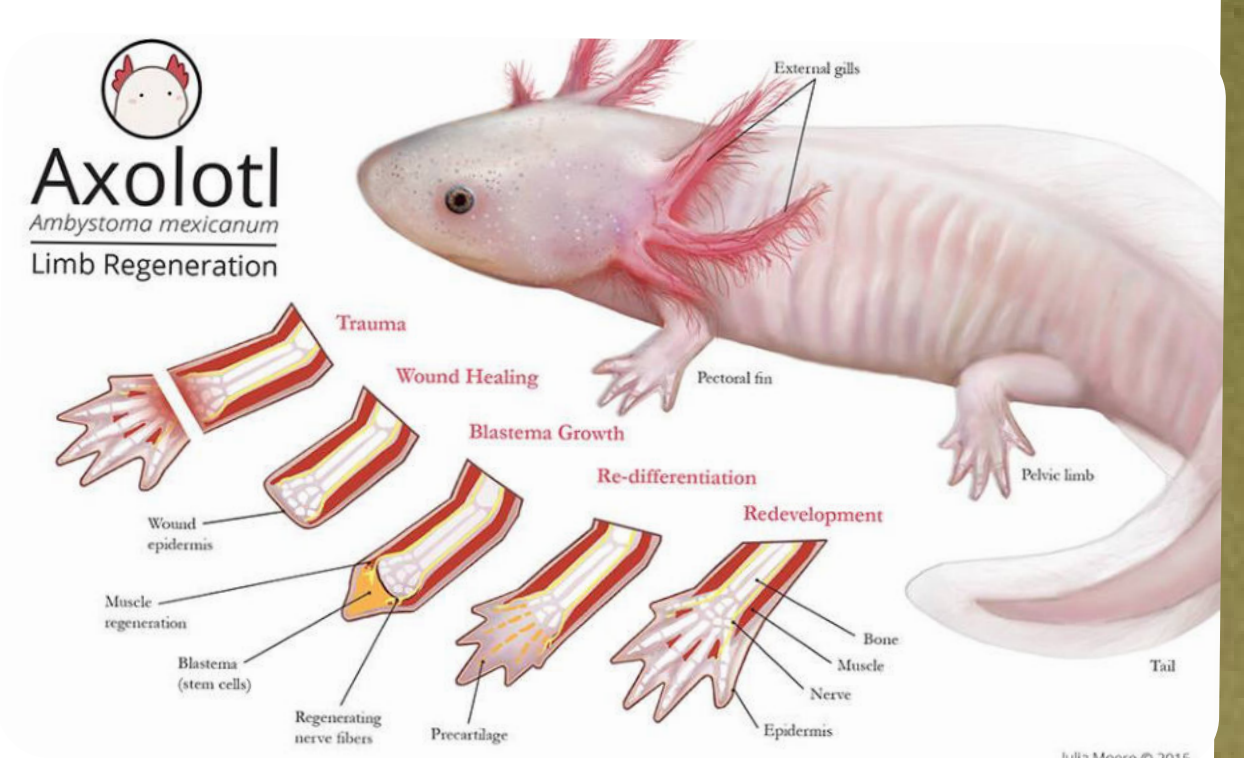
— du côté des organisations —

The problem of Ulysses' ship in Antiquity will serve as an example here! If we replace one plank of Ulysses' boat, is it still the famous ship, or has it become something different? And if we change all the planks, can we still call it Ulysses' boat?

Observation of the living world would suggest that it doesn't matter what's changed, as long as the boat is still navigable.

— du côté du vivant —

All the cells in the human body renew themselves very quickly, yet their functions remain assured! For example, the cells of the intestines and stomach are only used for a few days before being evacuated by the body. It is said that the body regenerates completely in 7 years! This is true in terms of the quantity of cells renewed... but qualitatively false. Some cells are never renewed (teeth, certain neurons, oocytes, etc.).



RESILIENCE

Strategies

Living organisms have the ability to return to a functional equilibrium (initial or new) following a disturbance or in its ecosystem.

#crisis #adaptation #choice #survival

Integrate the unexpected / Demonstrate plasticity

When external disturbances occur, the behavior and characteristics of living beings change. So sacrificing an element can sometimes prove to be a profitable strategy in times of crisis or need.

— du côté des organisations —

During the Covid health crisis, some companies were able to adapt to the situation by modifying their production and activities.

Toulouse-based Applications Laser Sud-Ouest, which used to specialize in laser cutting of various materials, has redirected its business to the manufacture of glass screens for point-of-sale counters (shops, pharmacies).

An example of production adaptation that saved the company and, more broadly, contributed to its resilience.

— du côté du vivant —

An opportunistic species is one that is highly adaptable. It occupies newly available habitats and survives in transitory, unpredictable environments. With little specialization, it modifies its feeding habits to colonize new areas (e.g.: carrion crow, bullfrog...).

Autotomy is the ability of certain animals (reptiles, invertebrates) to lose part of their body voluntarily: Many lizards leave their tail in the hands of a predator to free themselves.



#trial and error #experimentation
#evolution

Encouraging randomness and replicating successful strategies

Trial and error is a fundamental method of problem solving. It is characterized by a series of trials, continued until the search is successful, or until the tester stops searching.

— du côté des organisations —

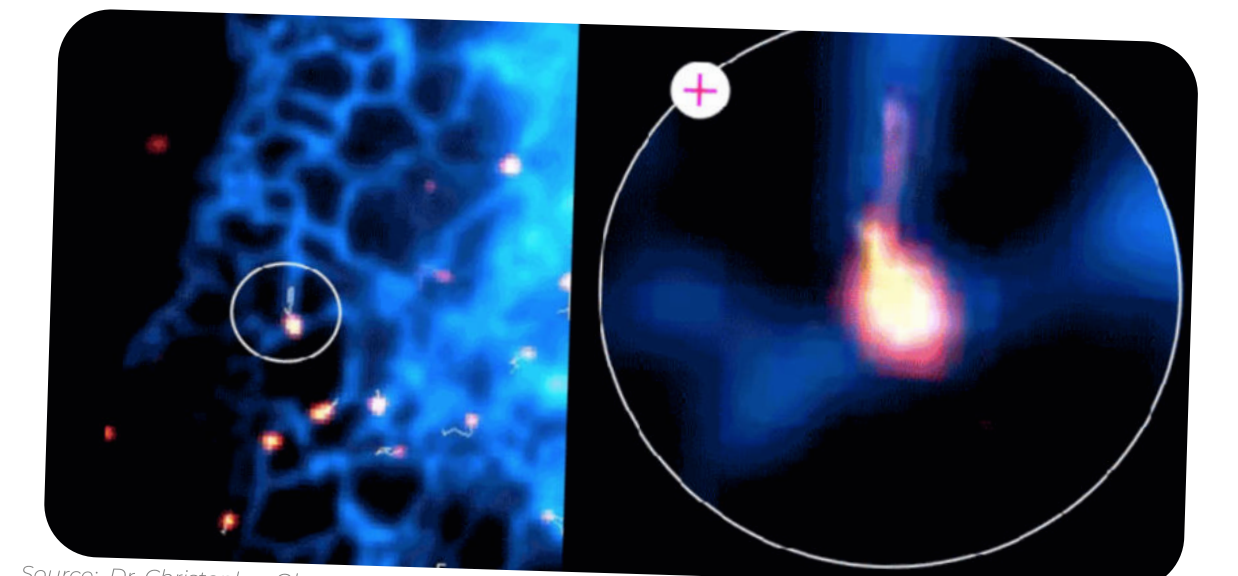
Tactical (transitional) urbanism presents temporary developments that use easy-to-install fixtures and fittings to demonstrate possible changes to the design of a public space.

These frugal, in-situ experiments serve as tests for potential perennial deployments.

— du côté du vivant —

As larvae, the Chrysopa is a formidable aphid killer, killing more than fifty aphids a day. To find their prey, they move around randomly. This random tactic optimizes the number of captures and plays a role in the survival of the species and the process of natural selection.

"Trial and error" is one of the pillars of natural selection. In cells or fibroblasts, proteins move randomly to ensure they reach their target (compensated for by redundancy).



Source: Dr. Christopher Charn, postdoc dans le laboratoire de Jennifer Lapointe-Schwartz, Université de Sherbrooke

#safety #anticipation #robustness

Promote functional redundancy

Living organisms multiply functions and information to secure the achievement of objectives or targets. A balance is thus maintained in terms of possibilities and ecosystems, enabling adaptation in the event of change.

— du côté des organisations —

In a nuclear power plant, everything is doubled up: two production units, two pumping stations, two control rooms, and so on. Each production unit has redundant circuits. In the event of a malfunction in one of the circuits (channel A), the second (channel B) automatically takes over to ensure continuity. This changeover from one circuit to the other is carried out regularly, ensuring that both are always operational.

— du côté du vivant —

Grazing fish and herbivorous sea urchins feed on algae and prevent their excessive proliferation, which could destroy the reefs. Should one of these species no longer be able to perform its function, the other will take over, thus maintaining the ecosystem.



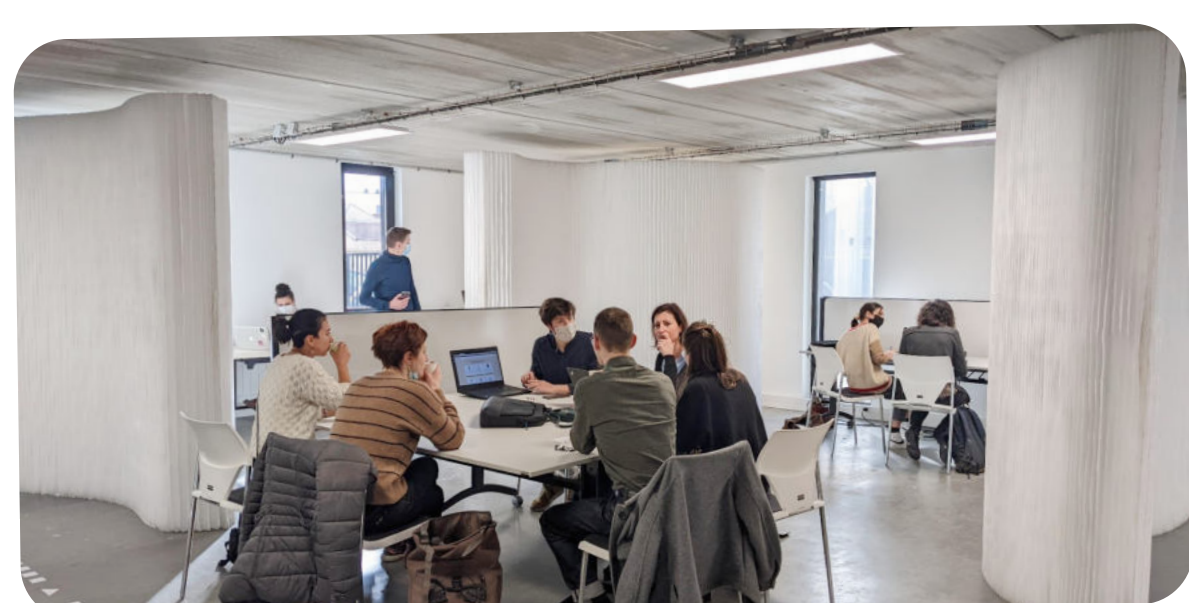
#adaptation #method #co-evolution

Adapting form to function

Form and function co-evolve (based on trial and error and natural selection) to best adapt to the environment.

— du côté des organisations —

Erasmé's UrbanLab is adapted to its primary function as a laboratory for collective innovation: a moving, recreational, modular and inspiring space to welcome, encourage contact and imagination. Above all, it is adaptable to the different formats Erasmé offers.



— du côté du vivant —

And no, the giraffe didn't acquire a long neck to fetch high branches! Those with longer necks, by chance or by mistake, had access to less coveted resources, and therefore reproduced better. Their long necks, enabling them to find their ecological niche at height, are therefore the result of natural selection over the course of evolution.



#interactions #variants #complementarity

Encouraging diversity

In nature, the emergence of diversity is not hindered, as it promotes long-term robustness. It exists in individuals and organisms, as well as in relationships and ways of doing things.

— du côté des organisations —

Crops that mix species are more resistant to disease attack and seem to last better over time. This is the principle used in permaculture through the trucking technique: it involves associating certain plants with each other to obtain beautiful harvests without chemical fertilizers!

— du côté du vivant —

The ecosystems that are most resilient to crises are those where there are many species and therefore great genetic diversity in ecosystems.

That's the advantage of biodiversity!



Source: Huguette Caron, responsable culture découverte à permaculture