

stories of the future

stories of now

responding to disruptions:
resilience, imagination and architecture

stories of the future / stories of now

responding to disruptions: resilience,
imagination and architecture



2023, Sarah Planchamp

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Disclaimer

This text took an unexpected turn.

When I started researching for the initial topic (something around the lines of how to adapt to extreme climates), I hit a wall.

There was a dissonance. Something was wrong between the topic that what I was about to start working on, and that what I tried to push aside. Thinking it wouldn't be of academic relevance.¹

Later on, the following events both made this dissonance grow stronger, and comforted the idea that the topic I had been repressing might actually be of academic relevance. The encouragement to read "*Deep Adaptation*", the English counterpart to "*Comment tout peut s'effondrer*", an atelier course where we would not do "normal" projects, and two other books written by architects this time: "*Climax change! How architecture must transform in the age of ecological emergency*" by Pedro Gadanhó (2022), and "*The planet after geoengineering*" by the collective Design Earth (2021).

That was enough for the topic to shift towards resilience, imagination and architecture in a future of major disruptions.

But then again I hit a wall again.

I was not in a position to actually fully engage with these themes. And there were three issues.

Firstly, the discourse around the topic was not exactly part of the curriculum. Of course climate change had become the reliable friend we would sit with in class: he was religiously attending lectures. Of course you would have heard about the legal and financial systems that would hamper innovation in the construction field and do more harm than good. They were the stubborn delinquents you would have to work with (or around) once you would actually "work". Of course also, you would have had discussions with the squad of "sustainability", of "new technologies", the

¹ Maybe that dissonance was there because "What could be more estranging than the times we're already living through, which blur uncomfortably into SF [Science Fiction] territory day by day?" [1, p. xii]

"re-series" (reuse, repair...) and "passive strategies". But what about aggressive strategies? What about the basis of the problem? And what about the actual risk involved? This was not really part of what we were expected to know for some reason. So this meant going back to the basics², both for myself and others who might read this and be in the same situation³.

Secondly, there was a question of responsibility. Especially since I am no expert: who am I to question anything? How can you criticise the way people handle when they are tied by society? Luckily, I was not alone in this thought process, and it actually relates to a concern multiple authors on the topic seem to have; for example, as Pedro Gadanhó states: "Who was I to preach radical change to architects who were diligently responding to the demands of their clients, their cities, their niche markets?" [2, p. 44]

Moreover, to the difference of authors who write knowing that the people who will read their text will actually have chosen to read it, meaning they'd be eager to tackle the subject, I would impose this on people who might have not wanted to. I know there might be nothing groundbreaking within the énoncé but still, sharing thoughts, information and opinions is a responsibility, one better not bypassed.²

This is not a comfortable topic and it has profound internal reverberations. As such it must be dealt with differently, as Emily Klein states in This changes everything, "Climate change is like that; it's hard to keep it in your head for very long. We engage in this odd form of on-again-off-again ecological amnesia for perfectly rational reasons. We deny it because we fear that letting in the full reality of the crisis will change everything. And we are right." [4, p. 4]

² Moreover, everyone should be allowed to tackle those issues at their own pace, not being imposed upon. [3, p. 54]

Many thanks to all who took time to listen to my endless rambles...

*Esha, Marc & co, San, Mélodie, Anna, Sibylle, Christian, Elsa, Damien, Matthieu
& Anni*

les Planchamp & co, toutes générations confondues

*Pedro Gadanho, Sarah Nichols, Corentin Fivet,
André Ullal & Arthur de Buren*

This text is thus more a series of questions than a list of solutions. Trying to understand the why before giving the how. Also because the more I dig in, the less I was able to see the how. But it does not mean there is none.

The research is divided in four parts: a card game, drawings of parallel futures, and this text with two sides: the right pages (the proper text) and the left pages (personal take outs and images – as it was a tool for me to better understand and integrate the new knowledge by linking it to personal images, diagrams, short stories...).

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*“We are unable to think outside of our narrative, because we confuse it with reality.”
[1, p. 113]*

1 **Our story of the far future – the missing puzzle pieces**

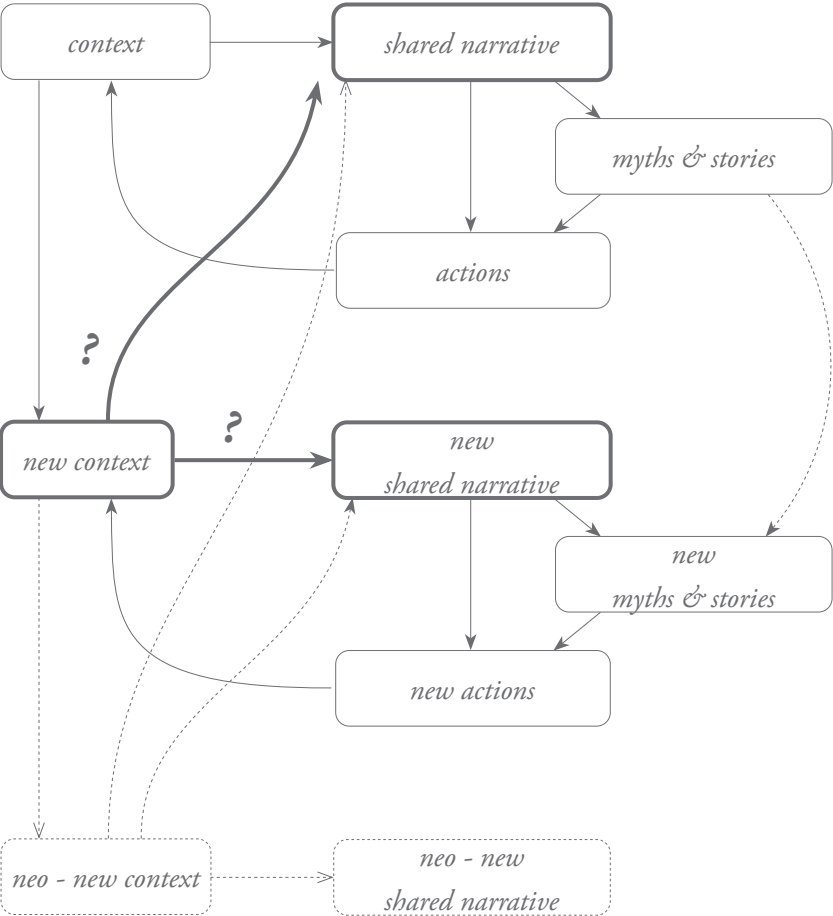
Let’s begin with a paradox: this text will discuss stories but has none.

There is no real research question, rather a big bunch of small questions: the collection of those that popped up all around the research. Spoiler, I will not be able to answer them. And most probably, you won’t either.

Firstly, because the issues we face as a society are intricately connected and very complex.

Secondly, because of the narratives we share.

Because we tell ourselves stories as a society. Together, we build narratives to explain how we as a group understand the world we live in. Narratives that then inform us on how to act as a society regarding those surroundings. They define our response to the world. “Les récits font naître des identités collectives, formant ainsi des communautés de destins.” [2, p. 217] Each group of people has its own set of common narratives and the resulting myths. And from one community to the next, those sets might differ strongly. Yet in our globalised world, the western culture has imposed many narratives that are shared by a large portion of the population, or better by a large portion of the population that has power. It is in this context that this text will ask questions, as it is generally accepted to be the dominant discourse.



While some of those narratives might be good for us, some can prove a clear disadvantage.

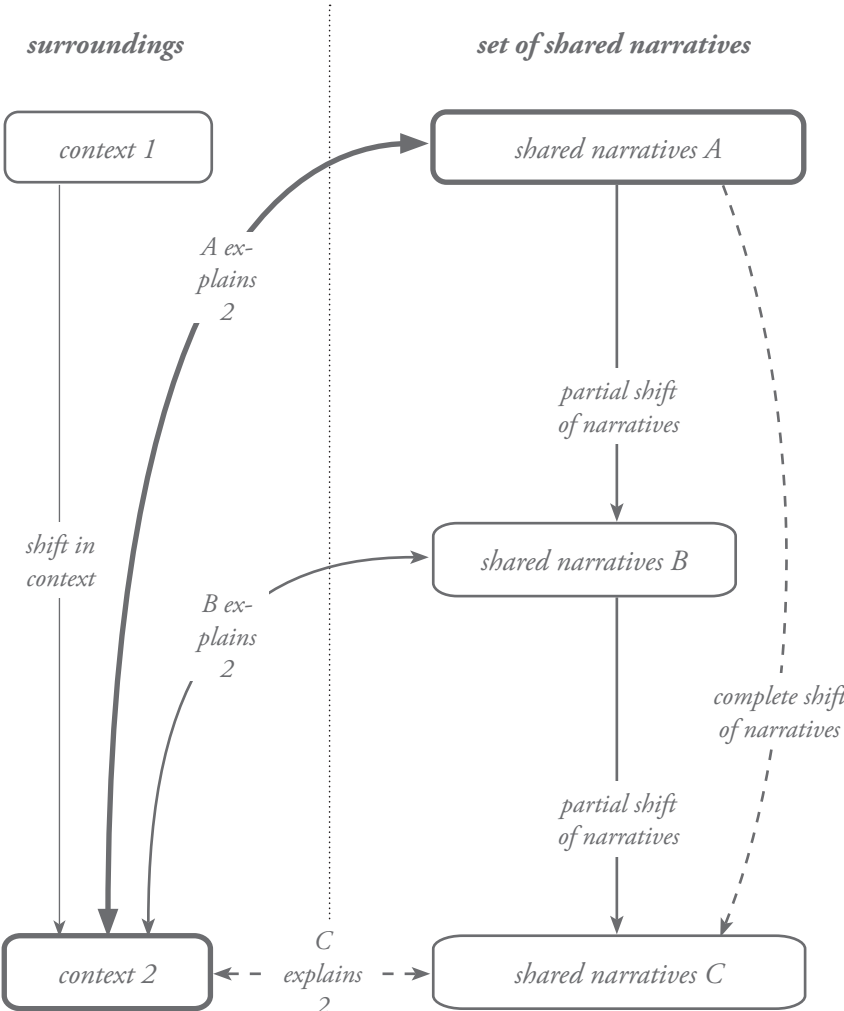
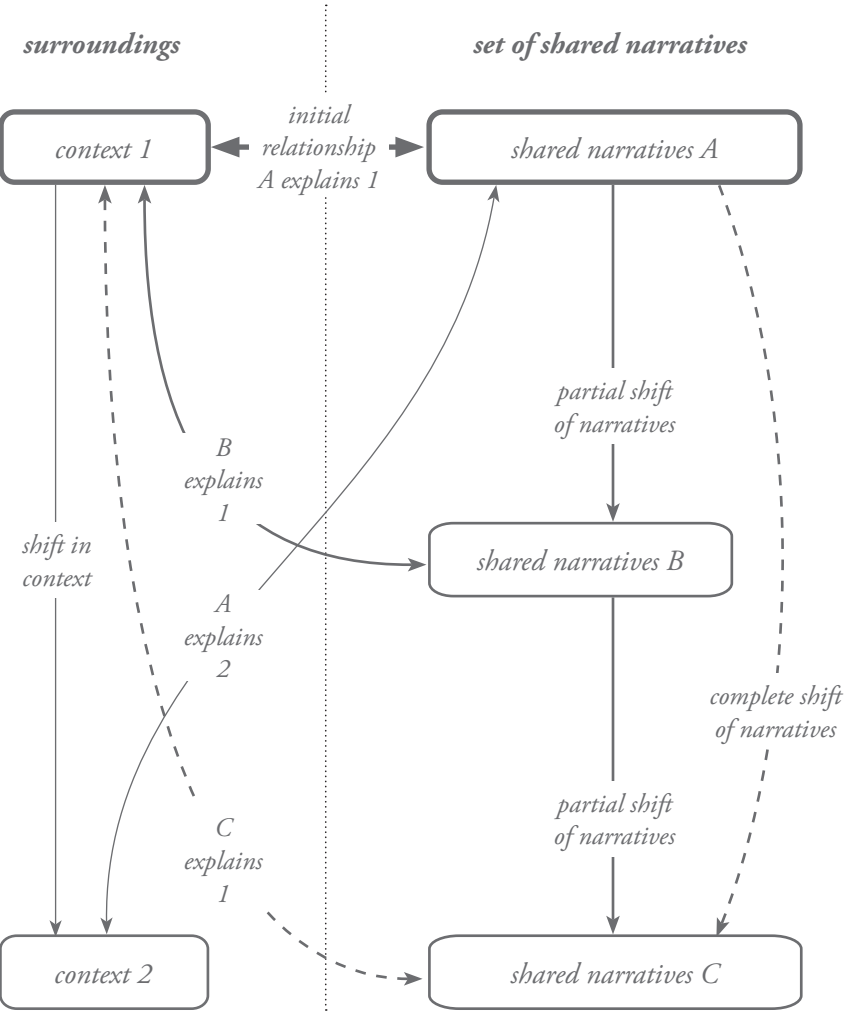
1. When they don't bring out the best in society.
2. When we confuse them with our context
3. Or when the world, or its perception, has changed:
 - 3.1. either the context has changed
 - 3.2. or part of the narratives have changed
 - 3.3. or both at the same time...

In the third case (3), the narratives you used to explain your surroundings are not relevant any more. It can firstly be because those artificial constructions don't fit the world any more (3.1), alternatively because some parts of those same artificial constructions have already shifted: new stories are being told simultaneously, that counteract the old stories that still need rewriting (3.2).

As of today, we are there.
In the third category. And both subcategories apply. Our world is changing: we experience events that our grandparents never saw. Our stories are shifting: we introduce new narratives that go against those of the same grandparents. This is not a blank spot, more a fighting ground for opposing narratives.

This uncomfortable in between requires new stories to strive towards less dissonance in our narratives. Moreover, as we will face disruptions in a more or less distant future, depending on our actions, we will need a net of stories strong enough to catch us and help us through it. As of today, the narratives we share give us only questionable tools in that regard.

The purpose of this research is to firstly show that we indeed need new stories to face our present and our futures. Secondly, to look at these new stories to reflect on the way they impact the solutions we imagine for our world when it faces those futures. And finally wondering how will the architecture of our world respond to those changes. Overall the case is a call for imagination: because neither industries, nor science, nor politics will have all the answers, but maybe we, as a giant community, can.



*the trespassing of 400 ppm
the 6th extinction
the Anthropocene
another depression
the last in date worldwide pandemic
1 death/second because of inequalities*

2 Our story of now

2.1. Our five limited resources

All of those are snapshots of our reality. And we are all familiar with those concepts, at least to some extent. It is also generally accepted that they are “bad things”. But that is our perception speaking, so let’s look a little bit at the background of this reality. The purpose of this chapter is not to give a complete overview of the issues we(‘ll) face. There are lots of documents to illustrate it better, from the IPCC reports all the way to the extensive literature around “collapsology”, the science of how collapses can happen.

Rather it is to give an overview of some inputs around those topics that are valuable to understand the foundations, not look at the house. Questions that are probably too rarely discussed. It is not about the numbers but the processes, because if numbers can teach us many things, they do not mean anything if one cannot understand where they come from.

They are collected under 5 topics, natural services, material resources, human resources, energy stocks and flows, and land volumes. All of which have limits (uncrossable) and borders (crossable but undetermined). [2, p. 38]

Natural services

For the purpose of this text, natural services entail everything that nature provides relatively to a species.¹ It can thus mean anything ranging from air to food, to seasonal variability and beauty. In fact, almost everything: we are so dependent on nature that it is not surprising.

¹ One of the ruptures our civilisation experienced was its differentiation from nature, and while it is normal to recognise something as not being us, it is relative to us. We usually look at what nature provides us, because it is relative to us, but the paradigm could and maybe even should be shifted to see what nature (humans included) brings to any kind of species.

*Sea level has risen by 20 cm.
We all believe cm is the scale to measure it.
That it will always be just centimeters.
Because at some point there will be no glaciers to melt anymore. Just as the
planet is not infinite, there is no infinite ice.*

And still...

*5cm only are due to glaciers.
half of it - 10cm - is because of thermal expansion
(which obviously won't stop when there are no more glaciers but only when
the water will start to boil and evaporate en masse - or when temperatures
decrease)*

*And there are still glaciers in Antarctica that are 2.5 km thick.
Imagine you could walk down into it, it would actually take you about 40
minutes to reach the ground.*

*So no.
The scale of sea level is meters.
Lots of them.*

[6, p. 5] [6, p. 11]

According to our current definition of it, nature is organised in specific ecosystems that influence one another. (Here one might wonder which is the egg and which is the chicken: the climate models (one big and blurry, encompassing more detailed regional models) or the ecosystem principle...) This means that a change anywhere can affect itself to the whole: everything is connected (in this case via a hierarchy that might be questionable of our vision). And this is why we have so many problems today; and why life on Earth has changed and survived until today.

In the realm of natural resources, there are both limits and borders. For instance, you can cut trees as long as there are some, then you cannot anymore because all trees are cut (you hit the limit) or you can cut trees up until a point (you don't know when) where the world of trees is so destabilised that even though there are still some trees, they are now dying on their own (you cross the point of no return without knowing it – border).

Are there any limitless natural resources?

Climate

The most present issue regarding natural services in the common discourse is unequivocal. It is climate change. One might wonder why that is so because some other potential disruptions are evaluated as just as risky for our civilisation like biodiversity degradation (both have the power to single-handedly force humanity on its knees). [2, pp. 85–88] And others are still largely understudied (atmospheric aerosols, ocean acidification...). Which might explain their relative absence in the public discourse.

“Climate stability is now a thing of the past.” [4, p. i] One might argue that there is nothing ever stable about the climate but this misses the point: there has been a shift so massive that relative stability is a “thing” our current generation will never know of.

To “solve” the issue, the only immediate response is a drastic reduction of emissions. Whatever the rate of reduction might be, 5.1, 11.2% or more, we need to cut down emissions if we don't want to reach the 2°C warming that is generally accepted as the last chance to avert devastating changes.

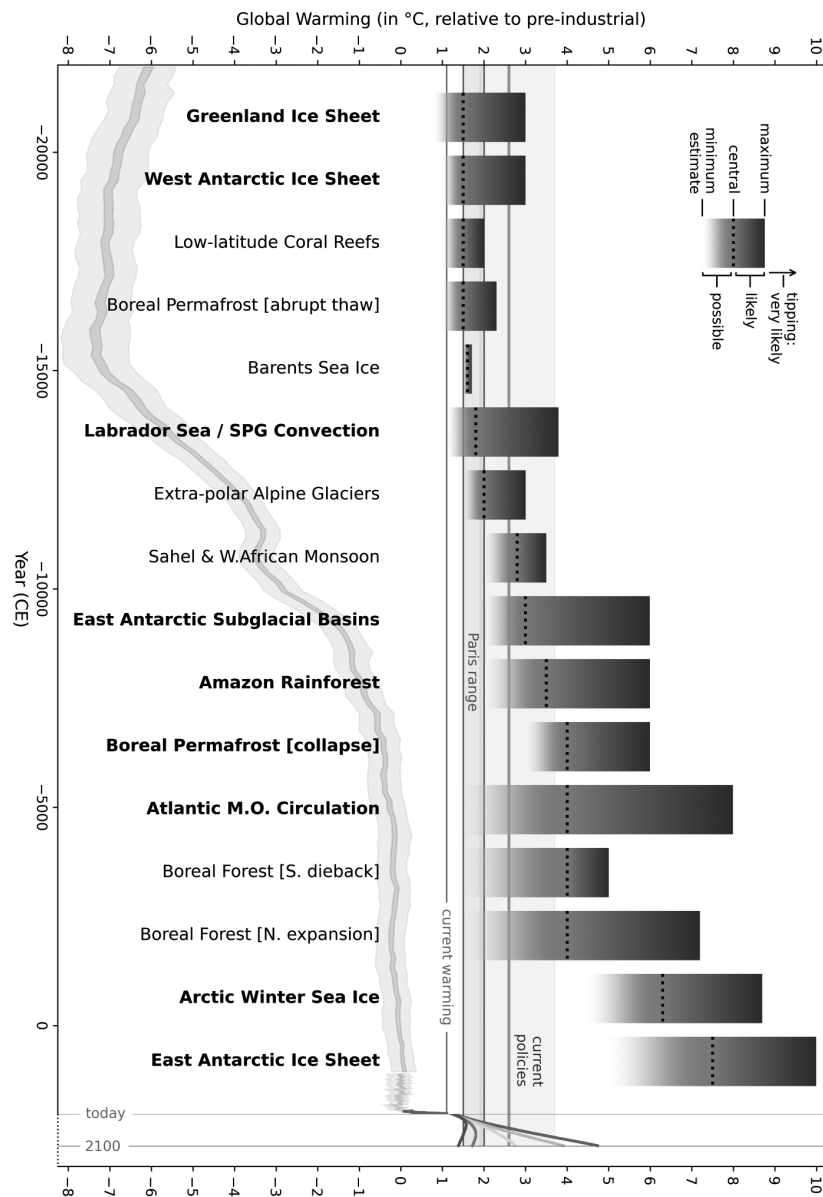
Humans at 37 °C = everything is fine
Humans at 38 °C = well today I won't be able to do everything I want.
Humans at 39 °C = staying in bed, doing nothing, waiting for it to pass.
Humans at 40 °C = am I going to stay alive?

[4, pp. 8–9] And we might very well wish we will not to trespass into this territory because already a temporary overshoot over 1.5 °C is expected to have massive repercussions as stated by the Working Group II of the IPCC: “Depending on the magnitude and duration of overshoot [over 1.5 °C], some impacts will cause the release of additional greenhouse gases (medium confidence) and some will be irreversible, even if global warming is reduced (high confidence).” [5, p. 19] We are already over the +1 °C benchmark now,[6] and up to today, we have received a lot of help from the strength of earth systems: for example, more carbon absorbed in the leaves (growth was more important for plants) and most of the impact got stored in the oceans as they heated up, preventing the atmosphere from heating up too much, and stored carbon, preventing the atmosphere from heating up too much once again – perfect collaboration. [7, p. 79]

And yet because of inertia (molecules of carbon dioxide, methane, sulphur dioxide, etc. in the atmosphere, heating up of the oceans...), even if the stop is instantaneous, the climate would continue to change for multiple decades. [2, p. 75] Thus “it is time we consider the implications of it being too late to avert a global environmental catastrophe in the lifetimes of people alive today” [8, p. 6]

“The politically permissible scientific consensus is that we need to stay beneath 2 degrees of warming of global ambient temperatures, to avoid dangerous and uncontrollable levels of climate change, with impacts such as mass starvation, disease, flooding, storm destruction, forced migration and war.” [8, p. 10]

In addition to the criticality of the situation, climate change is still not wholly accepted/understood. For example, the serious understatement by the Bank of England of the issue: “Climate change means we may face more frequent or severe weather events like flooding, droughts and storms.” [9] One can see two problems in this definition. Firstly, that it is not certain that we will experience changes in weather events. There is a consensus in the field of climate science that it indeed will happen. [5], [6], [10] And so there is absolutely no reason to say “we may” because “we will”.



Secondly, that climate change is going to result simply in weather events. This too is not true. Climate change will induce a cascade of other types of events from biodiversity loss to changes in the natural cycles of nutrients. It has the potential to put us down by triggering chain reactions, leading to disruption so major we would not survive it. [2, p. 85]

Remember, we are all connected.

Tipping points

Perhaps the bigger danger associated with climate change is the tipping points. “A tipping point occurs when a system which has been stressed beyond a certain level does not return to its original state when that stress is removed, but migrates to a new state.” [11, p. 85] In other words, when we reach a tipping point (a border unknowable exactly beforehand), even if we stop the actions that lead to it, the system is going to continue its transformation. Which in our climate case could mean further climate warming without direct anthropogenic drive behind it. It would be our fault, but not our doing.

Some of those tipping points are already looming at the corner: “at current levels of global warming (around 1.1-1.2°C), five climate tipping points are already possible in our assessment (‘possible’ here meaning above the minimum but below the central threshold estimate). These include Greenland and West Antarctic ice sheet collapse, tropical coral reef die-off, widespread abrupt permafrost thaw, and Labrador-Irminger Sea convection collapse. These are not yet likely, but we cannot rule out that they could still be tipped even if warming stabilised at current levels.” [12], [13]

If it happens, for example, permafrost thaw, it might induce further warming by releasing all the methane stored in the permafrost. [8, pp. 11–12]

◁ *Our global warming threshold estimates for global ‘core’ and regional ‘impact’ climate tipping elements. [12]*

«Our cultural bias toward focus on the complexity of details tends to ignore the complexity of relationships.» [14, p. 155]

Biodiversity

When we think about biodiversity, usually we think of biodiversity loss, and usually the word summons images of the orang-utan, pandas and polar bears. We connect a single species or maybe half a dozen to the issue. And yet probably the biggest problem about biodiversity loss is that it is global. And more importantly, that what is disappearing is not single species: that is just the tip of the iceberg. “In every aspect of nature, from the internal workings of organisms to whole ecosystems, we find the connections between things are as important as the things themselves.” [14, p. 155] And so what is going extinct are the ecological interactions, the species linked vertically and horizontally to a single specie. But that we don’t see because usually the linked species are part of the “biodiversité négligée” [15], species that we do not study in detail, and in fact don’t care too much about. “Faire disparaître une espèce c’est donc aussi en priver d’autres de ressources précieuses, voire vitales.” [2, p. 78]

The value we give certain species can even take the scale of an ecosystem. For example, Humboldt’s vision was that forest is the ultimate climax of an ecosystem; its best state. It has since been proven that it is not the case and that there are other ecosystems that are just as rich as the forests. Still when one sees the hype around forestation programs to store carbon, but knows that peatlands could be way more effective at it, [16], [17, pp. 122–123] one can wonder at such a deeply entrenched narrative of the ultimate forest. [18] Healthy ecosystems with diversity strongly impact the stability, productivity and sustainability of the planet’s life. “Réduire le nombre d’espèces, c’est réduire les “services” que les écosystèmes nous offrent, c’est donc la capacité qu’a la biosphère de nous accueillir.” [2, p. 84]

Remember, we are all connected.

“wherever (and whenever) in the universe available energy and matter are abundant, self-organisation leads to increasing complexity of activity and structure.” [14, p. 130]

Material resources

Material resources are considered to be everything that we physically use. They can thus range from extraction material to transformed material. In both cases, there are limits: as the planet is finite [19] there is a maximum amount of material that can be used. And when one sees that extraction has increased 27-fold in the last century, one can wonder how long that will continue... [2, p. 36] In fact many materials we deeply rely on are on the way to peak: silver, lithium, phosphorus, water... [2, p. 49]

Over time, natural material resources have been exploited by humans to construct many different kinds of infrastructures. From mobility, to communication, energy production, waste management... everything about our society depends on those physical infrastructures. In our western society, we view them as very strong because they rarely fail, but they are in fact very fragile. Most are old, overloaded and dependent on complex networks of skills, energy, or materials to function. [2, pp. 115–121] Even without adding more disastrous events like those that will eventually come as a result of climate change like, biodiversity loss and the trespassing of our planet's limits, those infrastructures can fall apart. And with them the system they support. [20]–[24]

Remember, we are all connected.

Human resources

Inequalities are at an all-time high. Even worse since 2020: “The wealth of the 10 richest men has doubled, while the incomes of 99% of humanity are worse off, because of COVID-19.” [25, p. 7] Since the 1980s inequalities have exploded. And we know this is not a symptom of a healthy society: inequalities undermine trust, innovation, health and increase violence. Moreover, in an economy like ours, wealth concentrates within the hands of an ever-smaller group, which keeps reinforcing the trend. [2, pp. 162–167]

if there is no cost there is no benefit
is it really freedom if it only serves a few?
how is capitalism going to take care of you when it is on its knees?
where does surplus value come from?

Inequalities seriously undermine the potential of human resources, by slowly weakening the majority. This is especially sad, because it might be the only place where limitlessness actually exists: in our imagination. Imagination is very powerful. It can make us test out strategies by mental experiments, connect with others around ideas, develop new ways, be a refuge against the world by telling stories,[3] come out of self-referencing loops and commentary [26]... And maybe imagination is one of the only resources we have limitless amounts of. There are untapped resources in all our heads, that could be used in many ways to find creativity, adaptation and change opportunities, as well as to test out ideas. For the authors of The Resilience Machine, “imagination is limited only if the images it produces only serve to contribute to the strength of a dominant or governing imaginary.” [27, p. 35] And inequalities certainly undermine the potential of it – just even by restricting the access to speaking up and information...² – under an oligarchic political and financial empire. [5, p. 61] Imagination will provide us with many new ways of dealing with our issues and with each other, but inequalities hold it down in a cage.

Another limit to our human resources is the de-localisation of care in the western society. We both import our carers (nurses, cleaners...) from societies at the margins of the western world, [28, p. 193] and promote a culture of uncare. And yet, “the imagination needed for our climate crisis is a caring imagination.” [28, p. 158] This applies to all of our crises.

Remember, we are all connected.

2 It is still bewildering to me that you have to pay to access to scientific publications, especially in a country where citizens pay for most of that science to be produced in the first place...

Resource	Year	Country	EROI (X:1) ¹	Reference
Fossil fuels (Oil and Gas)				
Oil and gas production	1999	Global	35	Gagnon, 2009
Oil and gas production	2006	Global	18	Gagnon, 2009
Oil and gas (Domestic)	1970	US	30	Cleveland et al. 1984, Hall et al. 1986
Discoveries	1970	US	8	Cleveland et al. 1984, Hall et al. 1986
Production	1970	US	20	Cleveland et al. 1984, Hall et al. 1986
Oil and gas (Domestic)	2007	US	11	Guilford et al. 2011
Oil and gas (Imported)	2007	US	12	Guilford et al. 2011
Oil and gas production	1970	Canada	65	Freise, 2011
Oil and gas production	2010	Canada	15	Freise, 2011
Oil, gas & tar sand production	2010	Canada	11	Poisson and Hall, in press
Oil and gas production	2008	Norway	40	Grandell, 2011
Oil production	2008	Norway	21	Grandell, 2011
Oil and gas production	2009	Mexico	45	Ramirez, in preparation
Oil and gas production	2010	China	10	Hu et al. 2013
Fossil fuels (Other)				
Natural Gas	2005	US	67	Sell et al. 2011
Natural Gas	1993	Canada	38	Freise, 2011
Natural Gas	2000	Canada	26	Freise, 2011
Natural Gas	2009	Canada	20	Freise, 2011
Coal (mine-mouth)	1950	US	80	Cleveland et al. 1984
Coal (mine-mouth)	2000	US	80	Hall and Day, 2009
Coal (mine-mouth)	2007	US	60	Balogh et al. unpublished
Coal (mine-mouth)	1995	China	35	Hu et al. 2013
Coal (mine-mouth)	2010	China	27	Hu et al. 2013
Other non-renewables				
Nuclear	n/a	US	5 to 15	Hall and Day, 2009, Lenzen, 2008
Renewables ²				
Hydropower	n/a	n/a	>100	Cleveland et al. 1984
Wind turbine	n/a	n/a	18	Kubiszewski et al. 2010
Geothermal	n/a	n/a	n/a	Gupta and Hall, 2011
Wave energy	n/a	n/a	n/a	Gupta and Hall, 2011
Solar collectors ²				
Flat plate	n/a	n/a	1.9	Cleveland et al. 1984
Concentrating collector	n/a	n/a	1.6	Cleveland et al. 1984
Photovoltaic	n/a	n/a	6 to 12	Kubiszewski et al. 2009
Passive solar	n/a	n/a	n/a	Cleveland et al. 1984
Biomass				
Ethanol (sugarcane)	n/a	n/a	0.8 to 10	Goldemberg, 2007
Corn-based ethanol	n/a	US	0.8 to 1.6	Patzek, 2004, Farrell et al. 2006
Biodiesel	n/a	US	1.3	Pimentel and Patzek, 2005

(1) EROI values in excess of 5:1 are rounded to the nearest whole number.
(2) EROI values are assumed to vary based on geography and climate and are not attributed to a specific region/country.

Energy stocks and flows

Energy is everywhere in our world, but the kind of energy we need to make it function as it does now not so much. There are two kinds of energies: those which are concentrated and evaporate (stocks) and those which are diffuse and continued (flows, dearly nicknamed renewables). But the one we need the most certainly is a stock: oil. In fact, oil represents 95% of our transports energy, [2, p. 42] and so, most of our system is highly dependent on transport and so on oil... “supply chain” might actually be rather an “oil chain” especially when we work in just-in-time. In fact, to have just-in-time³ in the first place you need an invariable source of energy to deliver: the paradox is that you just have shifted what the kind of stock it is you want: the storage of your products or the storage of high value energy in oil. High investment in fossil fuels via a highly competitive but organised field (advertising, lobbying...) certainly helped.

“We are running out of oil!” Same old discourse since the oil crisis, almost forty years ago. Why, because it is true. Then why do we still have oil? Because it is not the same kind of oil... An invisible shift has happened. This shift is called EROI, the energy return on investment. [2, p. 53] It describes the ratio between how many units of energy the use of 1 same unit of energy is capable of producing. Oil is still there, but as you over time need to dig deeper, further, and stronger into the ground to find some more, you start using more and more oil to get to the new oil. Where you needed little energy in the first place to gain a lot, you now have to invest a lot of energy to gain little. That is why oil is still there, and why oil is a border.

◁ *Published EROI values for various fuel sources and regions.*
[29, Table 1, p. 145]

3 Just in time is the idea that the enterprises don't have stocks. They constantly get what they need delivered, when they need it.

1:1

Imagine you are a society of farmers. In your world, everyone has to be in the fields because you need all hands to produce enough carrots to feed everyone.

Imagine one human eats 1 carrot per day (and that this is enough food to keep on the next day) and at the end of the day picks a single carrot to eat for the next day. Then two things happen, respectively don't happen: you cannot afford to have more people in your society, and all of those people are doing the same job.

2:1

If now you get access to a magical carrot that makes it possible to have two carrots at the end of the day, instead of one. Then you can suddenly feed two people with the work of one. And just as suddenly, the free people can do other things instead. This has two repercussions: you can have more people in your society, and only a part of the people are doing the same job. Your society grows in numbers and in complexity.

12:1

If now you get access to an even more magical carrot that makes it possible to grow twelve carrots for one person's work and that all people still only eat a carrot a day (must be boring by the way). Then you would have something similar to our society today. (Except you would have to replace the carrot by a barrel of oil, but that is details.) Your society still grows in numbers and in complexity.

100:1

is the magical oil of the early 20th century in the US

35:1

is the magical oil of 1999 globally

18:1

is the magical oil of 2006 globally

It is also why alternatives to oil, like biofuels, are to be criticised: the EROI of biofuels ranges somewhere around 0.8:1 to 1.6:1, with the exception of sugar cane – 10:1. In other words, the unit of energy you inputted gave you a single unit of energy. You do not get anything out of it. [29, p. 147] (Well it is not exactly true, you will get something out of it, probably a better exergy or more practicality in storage, but that is a topic for another text).

The problem is that it is assumed that to function as it does now our society, with its levels of complexity and the number of people involved, need a 12:1 EROI to continue on the same trajectory. As oil's EROI decreases, it gets less and less viable. [30, pp. 78–79] And alternatives need to be found. But humanity is resourceful and it is possible to find even new ways to “convert inputs to outputs”. [30, pp. 79–80] The problem is that the alternatives are strongly dependent on oil. [2, p. 49]

Remember, we are all connected.

When we think about land, especially in architecture, we think about a flat surface, not a volume. A surface because that is what is useful to us. Flat as we neither give it depth nor curve, afterall it is a plan. We forget the rich variety fo what happens in the gigantic cone that the solid angle of the said land gives. From satellites of the exosphere, auroras of the thermosphere, burning meteors of the mesosphere, the ozone layer of the stratosphere, clouds of the troposphere, the trees of the canopy, solidified elements of the crust, the mantle, the outer core, the inner core... Perhaps the only time we realise it is a volume is upon designing an underground parking space.

Land volumes

The last resources available that will be discussed here is land. Land is limited, but has to accommodate many. Both the wilderness and the humans in their quest. Land use is often questioned, but less is land scarcity, instead we focus on energy scarcity. Land scarcity becomes a problem especially in two cases: food production is ineffective, aka meat is produced⁴, and energy is produced by low power density crops in “large land orgies”, aka biofuels are produced. [7, p. 78] (Energy can indeed be calculated in many ways besides the typical and reductive kWh: m² / kWh, CO₂ / kWh, EROI, exergy,[31] emergy[14]...)

If the will to protect biodiversity is added to the equation of land use, to prevent the sixth Extinction, or create natural carbon retrieval, or prevent zoonoses, or all, it gets tricky. There seems to be a consensus that we need to give back at least half the Earth back to nature in order to protect biodiversity. [32] It may seem a lot but it was privatising almost the entire planet for humanity in the first place that was the real “a lot”.

The three opposing forces all require important expanses of land. [7] While neo-protectionism would argue that there is a need to protect massive areas of the world under our classical land preservation methods, “New Conservation” would argue for intermingled natural and human areas. [32, p. 74] So the questions complexify when we try to determine how the world would then be divided, and how it would be managed. Yet as a whole we would benefit from rewilding and protecting larger areas, for keeping illnesses at bay, storing carbon, protecting microclimates and biodiversity...

Remember, we are all connected.

⁴ As of today wild mammals represent only 4% of the total mass: 36% are humans and 60% livestock for humans. [7, p. 77]

growing
accelerating
hitting built in locks
facing unknowability

2.2. Problematic additional processes

All of those are snapshots of our reality. It is because of them that we feel we cannot do anything else. The story of growth makes us believe it is the only way, accelerating is the only solution, hitting built in locks makes us stay in line, unknowability⁵ freezes us on the spot.

Growth is one of the major culprits in the above-mentioned issues. But, as Kallis puts it, that “growth is an idea produced, imagined and instituted. [...] I call this ideology “the growth paradigm”: the idea that perpetual economic growth is natural, necessary and desirable.” [30, p. 63] It is so strongly intertwined in our lives, both physically and within the stories we tell ourselves that it is hard to get out. “The benefits of – and need for – economic growth are so widely assumed that they are hardly ever debated” [4, p. 1] Without the recognition of the impossibility of robust economic growth, it is thus improbable that there would be sufficient effort towards change, because the focus it sets on the necessity for the economic growth. And it is the case because our economical and financial systems need growth to exist: capital needs ever more increasing consumption to thrive and a finance industry based on debt needs ever more money to be viable. If we weren’t constantly “growing” you would not be able to capitalise on new products and services, and you wouldn’t make money out of debts. How can we rethink growth?

The second culprit is neo-liberal capitalism. The way the market doesn’t take into account costs external to it: costs for the environment, the well-being of people... has lead to let us think that those “things” are way cheaper than they actually are. All natural services and human resources are difficult to calculate into the capitalist economy, because they don not come with a price tag. So we give those external costs a monetary value based on assumptions that usually have no real technical answer to back them up. In other words, we almost randomly give a price to our environment, our future and our people to make them fit into the market. [30, p. 49]

5 Or the fact that we cannot know, that we cannot be certain about something.

To me, it seems we want an instant death.

Just like we wish that grandpa would have an honorable and easy death.

That he would just go to sleep to never wake up.

Because that way he won't suffer.

We want to enjoy life to the fullest (the carbonated dopamine fullest) until it suddenly stops. If collapse is quick enough, we won't feel it. We won't suffer.

That is where we are wrong. Because we will suffer.

Interconnected disruptions do not have to lead to societal collapse. Interconnected disruptions don't have to happen all at once. Even if they are rapid and exponential, they will still be progressive (the question is just how fast they would progress).

Not everyone will be touched at the same time, not every ecosystem will give up simultaneously in the face of destructive power, and so, for a while, you will have to live with the guilt of responsibility as your role in all this becomes more and more criticized. And then next to guilt there will always be the fear of being next. And that is not going to go away. Just like our issues won't if we don't act upon it.

Even if it comes to a death.

That will not be a peaceful death.

Kallis recalls this while citing Marx: “Money is the “fraternisation of impossibilities”, rendering things that are by nature incompatible and contradictory exchangeable for one another.” [30, p. 55] Moreover the power is concentrated into few institutions and has become so global that it is both “too big to fail and too big to jail”. [2, p. 103] How can we integrate what is left out by the market within our society?

The third culprit is non-linearity. Constant growth is exponential, not linear. It means the system accelerates: it has to produce more every single year, before rapidly reaching infinity. [8, pp. 6–7], [33] the problem with non-linear systems is that the response is not proportional to the cause. Chaque année qui passe “ne produit pas des effets proportionnels prévisibles mais augmente plus que proportionnellement les risques.” [2, p. 92] What can we do if responses are not proportional?

The fourth culprit is that it is impossible to predict everything: indicators of failures are visible only after the event and are difficult to spot before. Moreover, disruptions can manifest in many different ways and it is difficult to collect data. Which means two things: Firstly, there are no certitudes, and so sceptics will stay sceptics. Secondly, scientists will never be able to tell whether or not we actually crossed borders and won't be able to come back or not, and so optimists will stay optimists. [2, p. 155] Black swans, high impact unexpected events are also not to be forgotten, in a world of constant acceleration, they tend to happen even more. [34] How do we motivate the sceptics and the optimists?

And finally the fifth culprit is lock-ins. There are multiple kinds of lock-ins. Technological lock-ins, as new technologies and systems are integrated within society, they fill up an empty spot and make their mark. Over-time becoming so ingrained into our functioning that alternatives that would be more efficient have trouble to develop. An example would be the QWERTZ keyboard developed specifically for typewriters, and the DWORAK keyboard more efficient for our digital writing today. [2, p. 94]

Infrastructural lock-ins, when society has already invested in massive infrastructures, we feel we need to use something just because of the amount

This summer we had to send a fax across the Atlantic. In the context of a project where high technologies are part of everyday life, it felt as archaic as sending a telegram or a carrier pigeon. And yet the phone was still there, patiently waiting for a revival of its time of glory. It knew such infrastructures – the ones that are put forward first – are very difficult to dethrone.

of effort we put inside, even if it turns out it was not the right choice. Legal lock-ins, when laws and norms prevent necessary innovations. Behavioural lock-ins, when inertia in the ways people act, from denial to the lack of identification with the crisis, to incapacity to see slow and steady change, prevents action.

For example, we get used to slow change, thinking nothing did change when it has but was progressive. For example, for the US: [4, p. 3]

Year	2003	2013
Price of a barrel of oil in July	30 [\$]	105 [\$]
Average extent of arctic sea ice in September	6.0 mio [km2]	3.6 mio [km2]
Federal government debt	61'000 [\$ / household]	146'000 [\$ / household]

But the ultimate lock-in is the fact that a system in place creates its own tools of survival. It means the system gets stronger, even if it gets more vulnerable. Our world depends on oil for survival, but that is also what is killing it. Take out the oil of the equation, everything falls into pieces. [2, p. 104]

Knowing the impacts of the lock-ins and how it acts upon us is necessary to attack the root of the problem. But also we know we are creating new technologies, structures and ways of action, and we know those strategies might evolve in a changing world. How do we make sure that our initiatives of today don't end up in a dead end tomorrow? How do we create solutions today that do not involve lock-ins for the future?

Six metallic lines, each less than a few centimetres, hanging in the air a few dozen metres above the ground, jumping over the entire valley and disappearing on the other side.

A thin concrete slab, protecting a passageway in a steep slope from avalanches of stones three times thicker than it is.

An invisible net of electromagnetic waves connecting decoding machines, transferring a message like an echo.

2.3. The narratives of our story of now

All of those are snapshots of our reality. The story of now. This is the story of progress, of growth, of competition, of connectedness, of reduction to details, of rapidity, of individuality, of acceleration and of solutions, but also of fragility and acceptance of risk. These constructed narratives⁶ we share shape the way we understand our world. They are integrated in all of our western culture.

Sharing ideas, ideologies and narratives is part of what makes us belong to a culture, a civilisation, a group. It is one of the bricks of the act of belonging: a necessity. Yet those narratives have the power to shape the realm of our understanding of the world, just like a lens would deform the image you see from its reality. So just as much as it can prove useful to create a sense of community and give predefined ways to act, it can be disastrous in some cases. They might, as presented above, not bring out the best in society, building people against one another (ex: competition).

They might not fit with the surrounding context anymore (ex: growth) or oppose new emerging stories in a battle between narratives (ex: growth vs degrowth) that shifts the focus away from the real issue (ex: growth vs degrowth dilemma in a limited resources world).

Moreover, the tendency to be unaware of those shared narratives might push us to integrate those narratives as truths rather than mere collective sociocultural constructions. Sometimes we forget that they are not absolute truths about humankind. We imagine they are simply the only way to be, the only way it has been. We forget that other stories can be told, and have been told. But also, that an existing narrative does not protect us from another one emerging. [1, pp. 112–114]

And yet there are other stories that are being told. Stories from the periphery of the modern world⁷. Stories from other challenges. Stories from a

⁶ Narrative as “a particular way of explaining or understanding events” [35]

⁷ For example, in some peripheral areas, where there still are some communitarian traditional societies that are spared from our narrative. They are staying small, being kept at or keeping distance from our civilisation, and who are being

*Basic physics:
to shift from a solid phase to a liquid one, you just need to heat up the system.
1 person = 100 [W]
If you take many, it heats up fast...*

“Mastery of nature, that is “technology”, became an autonomous force, a central social imaginary, where what can be discovered should be discovered, and what can be done should be done.” [30, p. 65]

different time. A different time that is already around, for which we need new stories, ones that put forward different values and different objectives.

The narratives we acknowledge as truths about humankind hamper our ability to envision change. We might, for example, imagine that humanity is competitive in essence when one sees the extreme competition that drives our western society. Or that the biggest threat to our survival is a nuclear war (and the following winter). Or that travel only can be quick. Or that buildings must fit our needs. But those are not real truths: those are narratives we created, narratives we decided to share. And narratives that are a source of danger in a world of change when they are so completely accepted.

That is because they take an almost immutable shape. We believe those ideas are solids: things that can be engraved and that will never change, just maybe eroded with time. But narratives of our western society are liquids: they flow, come and go, evolve and change shapes, nothing is ever really set.

In a time of changes and disruptions, assumptions created by those narratives are dangerous: they might make us blind to alternatives. As a consequence we can fail to act, because we think there simply is no other way. Generally, that is not the case, there are alternatives. But consistent narratives that are repeated in circular reference [36] become stronger and stronger over time, even though they may be based on a mistake of input data.

If you assume that travel is fast, of course, everything that involves there to be no more flights feels like a doomsday announcement. [1, pp. 113–114] And that even though the fact that humans being able to fly in the first place would seem to be an impossible thing for most humans there ever was on Earth. Not to say that it was a mistake to learn how to fly, but that it is a mistake to think that we cannot do without.

sufficiently creative to protect their values. By being almost autonomous, they have different narratives. [2, pp. 194–195]

Similarly, when society spends so much energy telling you that everything can be bought, it might seem extremely counter-intuitive that because you have money doesn't mean you are protected. You might be able to buy yourself more time, but the issues at hand won't disappear in the front of your doorstep when time comes. You cannot bribe climate change.

We are in a society where commentary surpasses imagination. We are driven by remakes, analysis, references and reformulations. It is a narrative of circular references that encompasses almost all aspects of life from news to work to movies. Repeating the same stories over and over again prevents change, for we see no alternative to the status quo. It stops us from being creative and also from letting go of what intuition tells is no more. [26]

As Yusoff and Gabrys explain: "Given the challenges that climate change⁸ presents to us, which are political, social, cultural, moral, ethical, spiritual, physical, and emotional, our ability to imagine other possibilities, to embrace decidedly different futures with creativity and resolve, to learn to let go of the sense of permanence we may have felt about certain landscapes that have always seemed to be so, and to embrace change, is paramount to building resilience and adaptive capacity." [3, p. 529]

And for Joseph Campbell cited in Another end of the world is possible, "Any large-scale cooperation – whether a modern state, a medieval church, an ancient city, or an archaic tribe – is rooted in common myths that exist only in people's collective imagination." [1, p. 115]

If we are to tackle the issues at hand, we will need cooperation, mourning, imagination and many others. And we will need stories that support them: bricks to make sense of the new world we will live in, and the new society we will be.

8 Even though most of the research on those topics mainly focuses on the response to climate change, they seem to offer good ground to discuss other issues as well, especially since shared narratives are the basis of the societal norms. Moreover, the issues at hand are all interconnected, with often times similar drivers.

Mayas, Minoans, Hittites, Vikings, Native nations...

2.4. Stories from the past

All of those are snapshots of our past. And apparently, I'm not the only one who is hitting a wall...
And in a way I wish I could be. I wish we could all go back in time to change our past, reshape our ideas, change the course of time. But it is useless. The only thing you can do back in time is to look for what happened. Learn from glacial ice core heroes⁹, from past values and from our own human history.

We can learn four things in the past:

- 1. there are similarities concerning the way civilisations came to an end
- 2. the explanations we give as to why it came to an end tell us about how we see the problem
- 3. history is made of shifting values
- 4. being as “developed” like us is nothing but a trivial.

Upon doing so, one should acknowledge the risks that looking back implies: stories from the past are indices, not descriptions of what could happen to us. Moreover, there are major differences in scale: from the globality of our challenges, the range of the changes expected, the multiplicity of simultaneous preconditions or the importance of the feedback loops. [2, pp. 183–187] Still there are similarities in the way societies came to an end or experienced radical change in the past. Within the two categories of endogenous (internal to the society) and exogenous (external to the society) causes can range from environmental degradation, to resource depletion, wars, loss of commercial partners, or social reaction to those issues. In general the impossibility to consequently react to the changes lead to the demise of the said community. [2, p. 183]

.....
9 As in the Ice Chronicles by Lynn Margulis where ‘the real hero is a long skinny chunk of icy layered sediment that faithfully record 40,000 human lifetimes of weather change’. Cited in [3, p. 521]

“Earth’s story must be shared, too, because our oceans and atmospheres are changing at a rate rarely matched in its long history. Oceans are rising, while they are becoming warmer and more acidic. Global patterns of rainfall are changing, while the atmosphere is becoming more turbulent. Polar ice is melting, tundra is thawing, and habitats are shifting. [...] Earth’s history is a saga of change, but on those rare previous occasions when change occurred with such an alarming rapidity, life appears to have paid a terrible toll.”
[51, p. 5]

“Knowledge did not translate into power.” [37, p. 2]

We don’t always know what happened and what were the exact reasons for the past collapses. This leads to various theories that could explain the problem and, as we imagine those, they are tainted by our own current narratives. For instance, the theories shift from a collapse due to a single exogenous factor¹⁰ – almost as if a great society were too great to disintegrate on its own – to the impact of multiple preconditions that were sparked simultaneously or in an autocatalytic manner¹¹ – as if everything is linked like in an ecosystem. [38]–[40] Those two very different stories to explain one same event that lack sufficient remains to be explained, help us understand that there are many ways we can imagine how collapse can happen.

Since we cannot know for sure what the “real cause(s)” were, the theories we construct to explain the phenomenon are interesting: they might tell us less about what the situation was for the people at the time than they actually tell about the ideologies we project onto them. It is like filling a puzzle with missing pieces: we look for ways to fill the gaps with what we perceive now should fill them. But values might have been very different back then.

Shift in values have happened all over history. In fact, history is constantly being rewritten: as ideas change and values shift we rethink the events and reasons differently. What was once normality becomes a crisis. One of the most dominant examples of this effect would be the perception of slavery. What once was deemed acceptable – and in fact desirable – is no more. And as time went by and values started to include more and more diversity into the realm of the respectable human, the practice lost its grandeur to become more and more a barbaric act to be punished and never to be perpetrated again.

10 Like the Sea People that supposedly lead to the Late Bronze Age collapse around the Mediterranean (almost simultaneous collapse of the Mycenaeans, Babylonians, Hittites, Egyptians...). [38]

11 Like the multiple failures ranging from drought, to social unrest, to the end of far-reaching trade and degree of interdependence of the Late Bronze Age civilisations that would have led them to their demise. [38]

Imagine collapse would mean the complete disappearance of everything that made a civilisation.

So now imagine the world we, a conglomerate of past societies, “dead and alive”, would live in: we would either not have or have a different alphabet, or may not even be able to write, speak different languages and most definitely would not have the same values. We might miss out on powerful tools like black powder, astrology or cement...

More recently other similar re-evaluations have happened, where values are being reassessed. [41, p. 6] For example in Canada children of indigenous communities (First Nations, Métis and Inuit) being taken from home and persecuted in “residential schools” (up until 1996). [42] Today they can apply for scholarships [43] and an important rehabilitation process is beginning to restore respect towards indigenous communities. This shift is also correlated with the environmental issue, as indigenous communities are more and more often depicted as sources of valuable input regarding environmental protection and sustainable management. “As a prerequisite for their survival, indigenous peoples around the world have always observed their environment with great care. This has led them to develop knowledge, based on empirical observations adapted to local conditions, that allowed them to evolve as the environment has changed.” [1, p. 87] What was denigrated is becoming valuable, [1, pp. 86–88], [17, pp. 124–125] in this case sadly only now that the challenges we face require such solutions and not out of pure respect.

Moreover, looking in the past makes one realise the extraordinariness of our civilisations today. Coming to such a level of complexity is not something that should be taken for granted. It might require multiple factors that are not necessarily trivial. For example, the possibility of a civilisation like ours in the universe implies a relatively stable or at least the constant presence of life for long enough for it to complexify. And yet there are lots of threats to life in the universe (from high energy events to solar storms...), whether or not life played a role in its own demise or not. [44], [45]

Not to say that we as the humans of today are an exception, or that this kind of development is advisable and enviable. It is more that both in our own past as well as in theories regarding possible civilisations on other planets, the possibility of becoming “us” does not seem as trivial as we might think it is. [39], [46]

Realising our exceptionality might come with different ties to it: make us wonder how far we can go [19] or make us strive for its protection...

“It is worse, much worse, than you think. The slowness of climate change is a fairy tale, perhaps as pernicious as the one that says it isn’t happening at all, and comes to us bundled with several others in an anthology of comforting delusions: that global warming is an Arctic saga, unfolding remotely; that it is strictly a matter of sea level and coastlines, not an enveloping crisis sparing no place and leaving no life undeformed; that it is a crisis of the “natural” world, not the human one; that those two are distinct and that we live today somehow outside or beyond or at the very least defended against nature, not inescapably within and literally overwhelmed by it; that wealth can be a shield against the ravages of warming; that the burning of fossil fuels is the price of continued economic growth; that growth, and the technology it produces, will allow us to engineer our way out of the environmental disaster; that there is any analogue to the scale or scope of this threat, in the long span of human history, that might give us confidence in staring it down.

None of this is true.” [52, p.3]

*All of those are stories we tell ourselves, some in pure **denial**, some because of the influence of the shared narratives of our time:*

growthism (or the art of thinking growth is essential)

reductionism (or the art of focussing on precise details rather than a blurred but global image)

exceptionalism (or the art of thinking we are different, untouchable or better - or all at the same time)

accelerationism (or the art of believing all our problems will be solved if we could just access a certain technology by accelerating everything)

2.5. The resilient problem

Resilient problem

The paradox of getting stronger while becoming more vulnerable

One thing that for sure is resilient in our uncertain world is the fact that we will face disruptions, and that in a not so distant future.¹² There have been sufficient reports in all domains surrounding our western civilisation that major change will happen. Between climate change, biodiversity loss, social inequities, a financial system based on debt, and so on continuous growth, the rigidity of our normative and legal world, our dependence on energies that are disappearing: we are surrounded. That there might be a mistake in one IPCC report, an additional unplanned recession, or a misunderstanding on how extinction of species work – it will not change the outcome. Even the fact that we might overestimate one or the other of these potential sources of disruption won’t assure a smoother future. Each of these problems alone is a spark. And because of the massive amount of sparks we are being surrounded with, it essentially does not make a difference any more if we are right or wrong about all the details of their colours and temperatures. The fire will be lit.

If a change in the surrounding conditions happens (the details of the reports prove to be wrong or we can magically heal inequalities for example) then the object (the argument that there will be disruptions) will still function the same, respectively still be present. There is both diversity of the problems and redundancy. [48, pp. 16–21]

Our direction as of now, business as usual as it is being so dearly called, pushes us towards disruptions, be it climate change or peak oil or inequalities or biodiversity loss. As long as we continue going further into the direction of this resilience, the problem will still be there.

Either we work against it, reversing its direction to stop it from self-rein-

12 Disruption as “the action of preventing something, especially a system, process, or event, from continuing as usual or as expected.” [49]

If we strive for the resilience of our societies and its infrastructure facing changes, without addressing the resilience of the problem first, it will just be like entering a competition we cannot win.

“What has created the need for resilience in the first place?” [27, p. 14]

forcing, or we continue on the direction it is going towards and at some point all crises will coagulate.

Moreover, if the world is not linear any more, all of the above-mentioned concerns could be happening at increasing speeds, increasing severity, over and over again. In a non-linear world changes do not happen proportionally.

This would make the problem even more resilient for two reasons: Firstly, just as much as it is difficult to represent yourself with an exponential, it is difficult to understand a world where everything is accelerated continuously. Errors in expectations, potential in maladaptation, impossibility to predict catastrophic events because their scale just keep soaring as the problem self-reinforces itself: They will all become increasingly common, especially if we keep believing we can control our world and understand what is going on.

Secondly, the natural and human capacities (just like the derivatives of our society like our infrastructures) won't grow exponentially at the same time, chances are it will rather be the opposite. This will make us always more vulnerable to changes, especially since we rely so much on material things (transport, communications, food, shelter...) to make us live.

And so if those disruptions are doomed to happen and won't be proportional, how can we prepare to deal with them? If the problem is so resilient, how do we assure our survival? Does it depend on our resilience or to something different? Is and will our architecture be helping us in that direction? Or do we need to stop relying on the potential resilience of our environment, and focus on our own internal resilience and our communities' strengths?

In other words, how can resilience be overthrown?

“Nothing scares neoliberals more than radical science allied with social movements, but until such a union arises, they have little to fear.” [7, p. 98]

Interconnectedness

Climate change, biodiversity loss, pollution, inequalities, increasing debt, falling oil availability, zoonoses, polarisation of the discourse, non-resilient infrastructure... The issues at hand are plentiful, but also intricately connected. For instance, our financial system has repercussions on all: acting as an increaser of inequalities, impacting our environment negatively or forcing us towards infrastructure not planned for the long term. Because everything is so connected, it is sobering to try to tackle those challenges. The risk of interconnectedness is that we feel we have to change the whole world at once. Facing such a challenge, we might either believe it is impossible, even though small changes will always help (they might just not be enough), or that it is a great opportunity to restart everything.

Yet interconnectedness offers another opportunity as well: many try to fight off one or the other crisis. They just have not yet realised how powerful they can be together. All issues are to some extent correlated but are still seen as individual crises. The climate activists, the feminists, the vegans, the scientists, the socialists, the minority advocates, the specists... all advocate for their cause alone. Missing the correlation at the ground level, and caring more for details (reductionist mindset again), we are for now unable to ally and defend the common grounds of our claims.

In other words, how can we use interconnectedness as an advantage?

“it is important to remember that imaginations have histories” [3]

We are told to recycle, repurpose and reuse. We are told that it will save the world. And while recycling your aluminium packaging, repurposing an old shoe box for storage and reusing concrete slabs might actually help a little bit to save the world, some things can do more harm when being “re-”.

For instance, if you recycle the idea of climate change being a thing of the weather only, or if you repurpose oil car traffic as electrical car traffic, or if you reuse the narrative that growth is limitless, you will definitely not save the world.

What will change the world in both cases is being creative: creative enough to “re-” things and creative enough to “unre-” ideas.

Bias of the perspective of risk

Much of the disruptions we will face arise from the way we perceive risk. The common story here is that some level of risk is acceptable, and even necessary. We know that driving a car at high speeds is dangerous, but we accept the risk as we value our time more than the level of risk that driving faster represents. We assume that there will always be some level of risk. And in some ways it is true: you are never sure an asteroid would hit Earth or your neighbours would declare war. But then there are risks that the society internally decides to either accept or refuse, and so the level of “internal” risks we chose is our responsibility. In the example of the car driving fast, one just has to look at the speed limits for different countries. All accept a different level of risk.

In addition to the narratives we tell ourselves about risk, we have another problem: we are focussed on immediacy. From instant gratification to instant treat, we are biased towards what can happen now. Not what can happen tomorrow. And whether that would be because it acts as a defence mechanism, or because it is a socio-cultural construct that promotes the instantaneous, or because we need it to navigate our current civilisation of rapid technologies and changes might help understand why but won’t change the fact that we are bad at seeing certain kinds of threats: those that are not immediate. So we need other ways of being remembered to look at risk of the further reaching future: shared narratives and common stories are part of this.

The truth is we are facing a global systemic risk. Our system is so big that the risk is multiplied drastically. [2, pp. 123–125] But we fail to see it. It is just as difficult to predict as to understand the risks. [2, p. 140]

Describing approaches to the communication of risks, “the idea that existing beliefs about risk affect the interpretation of the risk message”, is acknowledged and even used in certain strategies, for example, when organisations begin by first involving key stakeholders to understand what are the narratives of risk present in the society to then better communicate the risks of a specific issue. [49, p. 55]

*Covello and Sandman cited in The Routledge Handbook of Urban Resilience
define 4 different types of risk communication:*

1. *"simply to ignore the public" = protection but no saying in public policy around risk*
2. *"how to explain data better" = better communication but still need of motivation to participate*
3. *"building a dialogue with the public" = awareness to public outrage, but difficulty to plan long-term goals*
4. *"treating the public as a partner" = more inclusive process, but problems of inertia of behaviours and ideas*

[49, pp. 53–54]

An example of that is the failure to communicate about risk when two different sets of narratives face each other. Comparing perspectives both of the US Army and the native Polynesian cultures regarding storage of chemical weapons on an island of the Hawaiian Island chain, Rogers explained that the failure to communicate about risk was because of the disparity of 12 points of those perspectives. The two protagonists had very different narratives that prevented them from collaborating: the most important being maybe that:

1. the Army had a deductive and reductionist approach (attention to details, detail 1 + detail 2 + ... + detail n = whole) which opposed the native inductive and holistic approach (attention to the whole, detail 1 + detail 2 + ... + detail n < whole)
2. the Army viewed the risk as acceptable when minimal, whereas for the Natives absolutely no risk was acceptable. [49, pp. 56–57]

Moreover, "In risk theory, determining what counts as a significant risk configures the sphere of the actionable, and thus the sphere of mitigation" [3, p. 519], meaning that our shared perception of risk will determine both what we will accept and how we will act upon it. Our narratives thus clearly shape the realm of what can happen to us, as it defines the risks we take in the first place. In the case of the Western world, we are rather in the shoes of the Army: accepting the risk to some degree. The question though might still be how much we really are risking?

Risk theory asks another question: who do you involve and how?

In other words, who can define what risks we are ready to take as a society?

financial collapse

“faith in “business as usual” is lost”

commercial collapse

“faith that “the market shall provide” is lost”

political collapse

“faith that “the government will take care of you” is lost”

social collapse

“faith that “your people will take care of you” is lost”

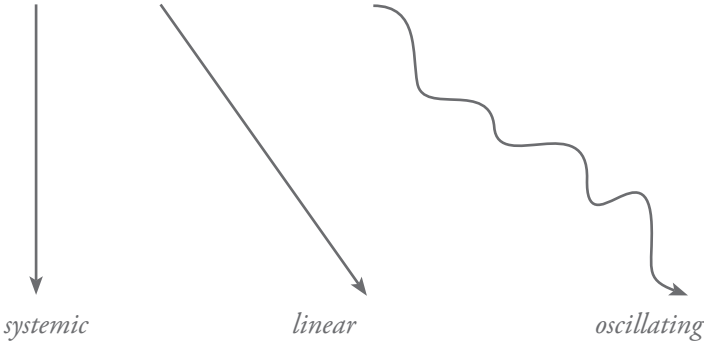
cultural collapse

“faith in “the goodness of humanity” is lost”

ecological collapse

loss of the possibility for a new society to emerge on the planet

Orlov’s collapse scale [50]



collapse trajectories [2]

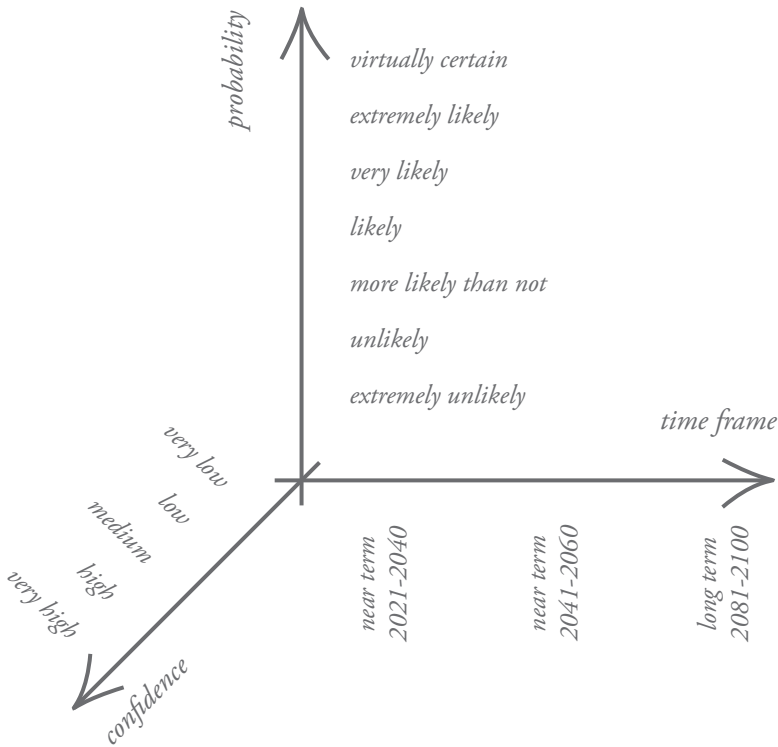
2.6. Disruptions?

According to all of those latent issues and learning from past and present stories, it is possible that we will face disruptions and maybe some kind of collapse. And yet there is no way of knowing when and how... For the when, it is imagined that a failure of the financial system or of supply chains could be sufficient to destabilise by a shock wave all of our society. But one can imagine climate change, degenerating wars or another pandemic having similar impacts as well. For the how, there are many ways civilisations slow down, both in the number of values they lose in the process and the trajectory of the process. [50] Collapse might very well be a slow but steady way down or a bumpy road. We will not know.

Those facts and thoughts do not prove that there will absolutely be a collapse. But that there are multiple crisis, fought at the same time in the same battlefield. And the structure “globalisée, interconnectée et verrouillée de notre civilisation la rend non seulement très vulnérable [...] mais la soumet désormais à des dynamiques d’effondrement systémique.” [2, p. 129] It is a risk we face, and when facing risk we’d better prepare a little. And since there are multiple problems, we might as well find multiple solutions, to not lose everything while betting on a single way out.

“It is the synchronisation of “micro-collapses” of the subsystems that eventually brings down the larger system that they make up.” [1, p. 83]

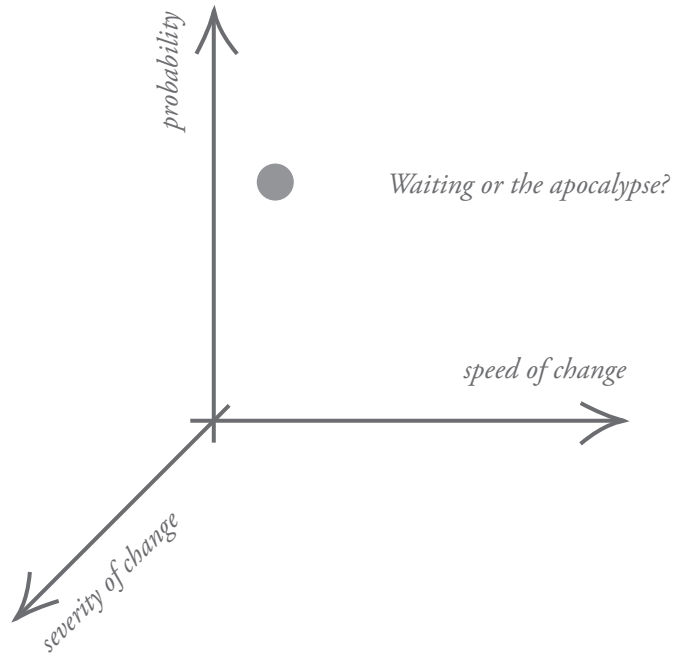
We all have experienced it: that feeling of floating in a bubble distant from the others when we go back to normal life after a traumatic event, the death of a loved one, a dramatic accident. In those moments we have a different story, with different values. Death has redistributed the cards: a priority of yesterday is not a priority of today.



3 Our stories of the future

3.1. Different kinds of futures

First it is important to note that there are different kinds of futures, and it is not only a matter of time frame. In that regard, the IPCC has an interesting approach, organising the future along 3 dimensions: time frame, probability and confidence, which fits the scientific background of the endeavour. Yet maybe another should be added: severity or the range of impacts. Even though, especially when regarding climate change, a small difference could induce massive change, there will definitely be some future events that have very different kinds of impact. Some will be way more severe than others, and in a world of urgency, it might make sense to define priorities.

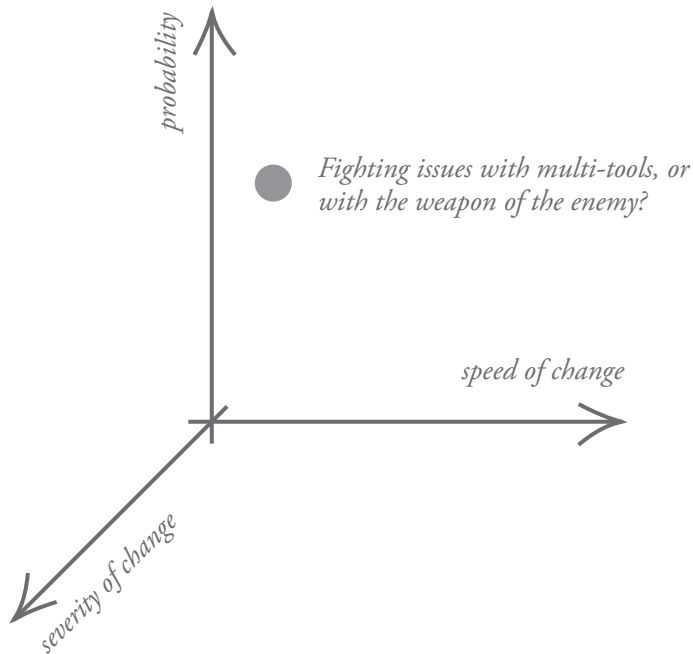


3.2. The normal ways – those who fit the current discourse

In the public discourse there seem to be mainly two ways on how our situation regarding climate change might be resolved. (As for the other issues, maybe they are too intricately woven inside the system for us to really think about how to alleviate them, besides, of course, demonstrating in the hope that politics and economics will accord us what we want.)

1. external intervention
according to Wadhams, it can take three forms in the public discourse of the western society: [11, pp. 173–174]
 1. God's hand will help us
 2. UFOs will have pity on us
 3. someone will invent the magical tool to solve climate change.– accelerationism
The fact that it might be too late by then and that there might not be any silver bullet like the genetically modified lichen of *The Collapse of the Western Civilisation*, [37] do not seem to bother the defenders. [53, pp. 138–154]
2. apocalypse
Master metaphor tool [3, p. 520] and old narrative from the religious dominance of the western world, it is deeply ingrained in how we think disruptions and collapse can happen.

We have to face “The end of the idea that we can either solve or cope with climate change.” [8, p. 5] But it does not mean we have to choose between waiting and the apocalypse. Just as there are many ways on how collapse and disruptions may happen, [50] there are many ways to find alternative stories to those two.



3.3. The dangerous in between – those who fit all discourses

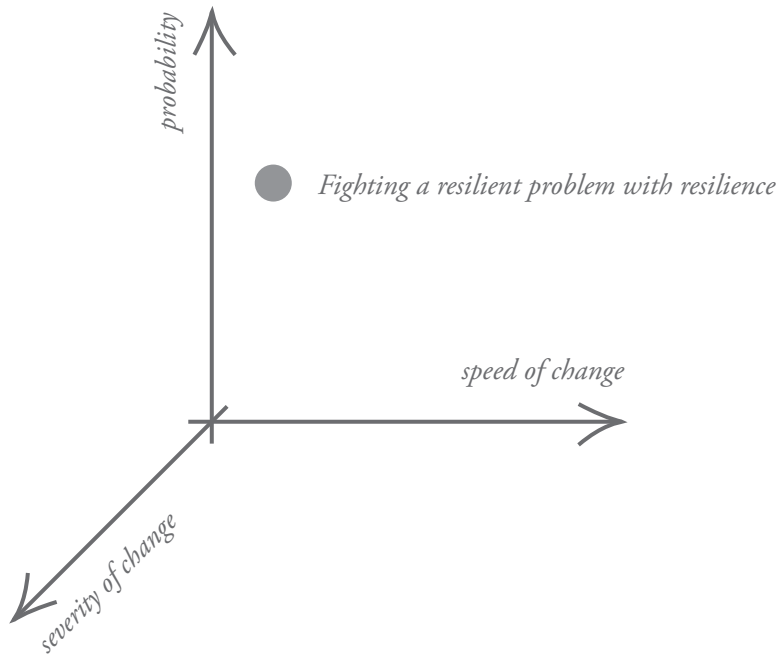
The few concepts outlined here are essentially tools that can be applied to all possible discourses and stories – because they are just qualities. The idea here is to understand what comes with strings attached, to better understand how we can articulate those concepts for them to be directed towards the narrative we choose. Those concepts are called dangerous because they are weapons that can be used on both sides of the battlefield, to promote one’s own interests. On the side where the narrative is status quo and on the side where the narrative is urgent action.

Resilience

Firstly described in the 1970s and applied to ecological sciences to describe concepts of stability and equilibrium of ecosystems, the term resilience is now used in a wide range of disciplines. From the interdependent relationship of people and their environment, to engineering of materials and the psychological response of an individual facing a traumatic event, no field was spared. Because of that, the number of its definitions expanded greatly, almost to the point where the word risks becoming an empty signifier.

It is thus important to make the distinction between resilience created “by nature” and resilience created “by humans”. Initially, resilience was in fact only applied to ecosystems: “by nature”. In that case it is acknowledged that ecosystems are in a “dynamic non-equilibrium, which goes through four phases.” [1, p. 82] Growth (birth of the ecosystem on “blank” ground), maturation (complexification and accumulation of energy), collapse (liberation of energy), reorganisation (a transformation operated but identity and structure is maintained). Ecosystems designed by nature, when untouched, are resilient: even a forest that collapsed by fire and transformed, will have its share in the overall mechanisms¹³ of nature as a whole.

13 Sorry for the allusion to nature as a machine, we just miss words on how to speak about nature without connecting it to our mechanised and millimetre precise world.



The danger is to think that we as humans can do the same.

We believe that mimicry of nature will be the magic solution: having survived for so long, we know her¹⁴ designs of resilience work. Yet caution is advised, for at least two reasons. Firstly, we do not completely understand nature. Scientists would probably be the first ones to acknowledge that fact. For example, everyone has seen lichens. They are everywhere. For over 150 years, scientists have known that they were something special: a symbiosis of a fungus and an alga. And yet in 2016, upon running DNA tests on *Bryoria fremontii* and *B.tortuosa*, they discovered three different kinds of DNA. There was an additional fungus. [54] What we really know about nature, and probably even more about symbiotic relationships, is probably way less than we would expect. Secondly, there is a difference of timeframe: Nature had years to perfect the art of resilience. We have used the term only for 50 years... So if we are to use nature's tools, we'd better be cautious.

For resilience design by humans, definitions are not quite the same. In material science, it represents "the ability of a material to bounce back to normal after a testing event". [28, p. 144] Community resilience is described as "the capacity of a system to absorb disturbances and reorganise while undergoing change to still retain essentially the same function". [28, p. 146] Generally, resilience means the ability of an element to reduce disruption, to learn from adversity, to adapt to changing conditions, and to maintain itself or evolve under evolving environments. It involves two elements: an object and a change in its surrounding conditions. Resilience is the quality that the object has, or lacks, to become functional again after the change in surrounding conditions. Its ability to bounce back, or even better, to bounce forward.

What tends to be forgotten in the process is the basic principle of physics: every kind of movement implies a vector, a direction. The qualification of resilience is based on the assumption, mostly issued by an organism of power that there is a direction to follow. A way in which a system, a community or a material has to respond. And generally, that direction is the

14 I'm going to use her, but maybe it is a his...

- *Let's protect ourselves from the ocean!*
- *Yes, that will make us resilient!*
- *Of course! If we elevate the houses. In case of a flood, people will be protected.*
- *Well i guess we'd better build a 2 meter high wall. That way we can continue to work just the same.*
- *And we don't we just go inland? 2 meters might not be enough, plus where do you find the resources to elevate the house or for the wall?*
- *And then, what are we supposed to do? No one works anymore to built this instead? It is the same if we elevate the house! If we don't protect the roads people won't be able to work!*
- *Does that mean we should live in a cage? ...*

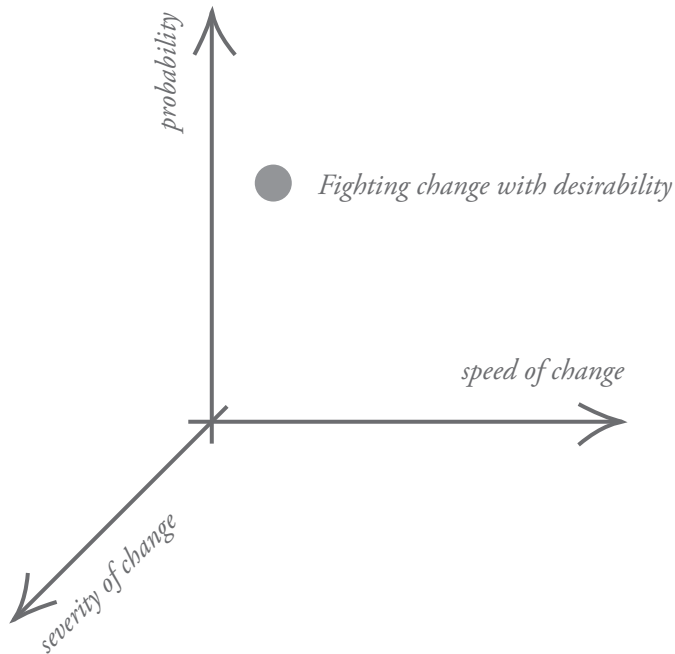
welcome to the trouble of having very different stories in mind - and very different timeframes for those stories

one of business as usual, carrying the above-mentioned ideas of progress and competition. In that way resilience fits right into our current story: it is a solution to our problems of disruptions, the responsibility of the individual to take action, it is a way to grow, to become better within the existing framework. And so it is understandable that it is acknowledged as a remedy for our times. It simply matches the discourse.

Another “problem” of resilience is its potential pervasiveness. It essentially happens when a subsystem is pushed to become resilient, which in turn negatively impacts the system as a whole, making it less resilient overall. [55, p. 148] For example, the “significant impacts of snow-making on water supply and quality, sacred lands and ceremony, public health, and, ironically, carbon emissions.” [56, p. 704]

With the awareness of those limitations, resilience has advantages still. Creating resilience means looking forward on what could happen. It creates narratives of events and their response, in a way being an attempt to prepare for a set of possibilities. It is a ground of discussion, a place where ideas can be worked through and refined. It thus also connects different disciplines – even if they have different interests – under the same term, forcing questions if not action. Moreover, thanks to the fact that it fits the current discourse as a remedy for our timely challenges, the resilience theme profits from a substantial visibility and encouragement from the existing structures, especially in comparison to other alternatives.

Resilience is being explored under many ways and as such might offer new paths to think about our futures. But its pervasive side needs to be acknowledged for us to make use of the concept. Resilience does not translate into survival.



Desirability

Many actors of the transition describe the “desirability of the future” as the key to change human behaviours towards a better future.¹⁵ The reasoning is that if people want something out of the future, and can get a clear image of how this future might be, they are more likely to fight for it. In the case of the Transition movement, that strongly relies on desirability, it is a motivation to change habits. It generally involves both the way one acts (job, food consumption, ...) and the network upon which one relies. In the context of the Transition movement, the desirable future in question is a future with greatly reduced consumption and carbon emissions, stronger links in between people and alternative ways of providing for oneself. [57] But desirability is also dependent on a direction: many people might desire many different things.

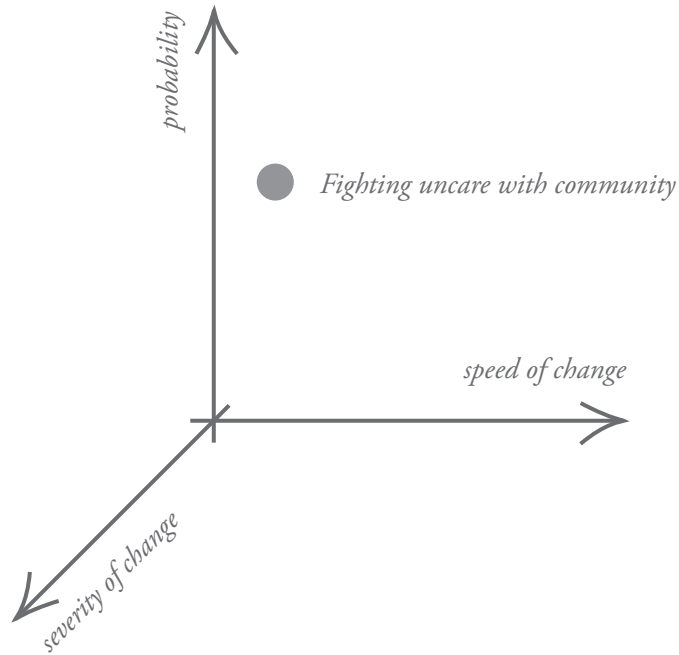
Moreover, desirability makes it seem easy. Not that it would be bad for it to be easy, but because facing those disruptions will have deep impacts on our entire inner and outer world. Facing changes this radical will require a serious reevaluation of the ways we understand our surroundings. It means letting go of a lot of preconceptions, and especially of any kind of certainty. In that sense some argue that we need a clear rupture, a trauma, to really be able to fully embrace change and act accordingly. The danger can thus be that desirability might be a little bit too superficial, and make us skip the trauma phase.

15 See for example (‘Réseau Transition Suisse Romande - Le réseau des initiatives de Transition’ n.d.)

“Penser l’effondrement, c’est faire en permanence l’exercice de renoncer à une vision homogène des choses.” [2, p. 215]

Desirability could thus both help us getting out of the mourning process, or on the other end prevent that process from happening. In the second case, if we believe in a desirable future, chances are it is something rather similar to the society we have now. At least it is the way that some advertisement sells it: a lush green field, in the air the outlines of a new house, and in the foreground a couple holding a plan of their future house. We are told that this is (one) of the desirable futures to “protéger l’environnement en construisant durable.”

Yet, even if it might be a good start, the urgency will require different stronger solutions, and so we have to acknowledge the fact that change is going to be all encompassing. [1, pp. 32–54] Moreover, desirability might make us design a future we want to live in, and are afterwards not ready to give up any more in case it turns out not to be the best solution because of new inputs. Desirability does not translate into survival.



Community

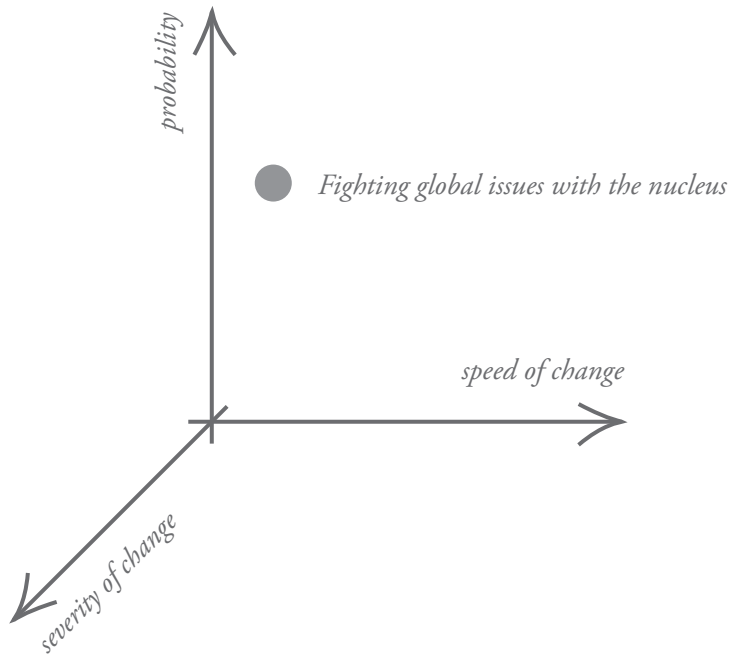
When discussing the scale upon which challenges are to be acted upon, there are many answers. It can very much be a global scale as in the utopia set into 2047 of Half Earth Socialism, [7, Ch. 4] to very small initiatives in the survivalist communities, to cities [58], to various scales all at the same time as in the many propositions of the book Drawdown which specifically tackles the issue of GHG emissions. [17] Yet there is one queen scale that supposedly is a recipe for success, ever heard of it? It is called community. [3, p. 524]

Community is the new scale.

It replaced the metropolis that the modern movement so dearly cherished as the scale of the time. If one needed proof that there is a change of paradigm happening within the field, this might be it. It might as well be way too timid for everything that is at stake but that is a start...

And yet it is rarely defined... For the Cambridge dictionary, there are two possible definitions. Firstly, it can describe “the people living in one particular area or people who are considered as a unit because of their common interests, social group, or nationality” and secondly as “a group of animals or plants that live or grow together”[59]. While the first is interesting because it distinguishes between people being linked by a place (and specifically a place to live in) alternatively by their common interests, the second even more striking: community can apply to plants and animals as well. How fitting that our “new” solution scale to tackle the challenges ahead is one that might include multiple living species! One might still argue for the “or” of the description (after all are connected as we have seen) but nevertheless it seems like an interesting shift.

Other definitions give the word almost an eerie feel: “Community is both a feeling and a set of relationships among people. [...] That treasured feeling of community comes from shared experiences and a sense of – not necessarily the actual experience of – shared history.” [60] There is no more connection to place, but rather a malleable and constantly evolving web with undertones of care for one another as one acknowledges the de-

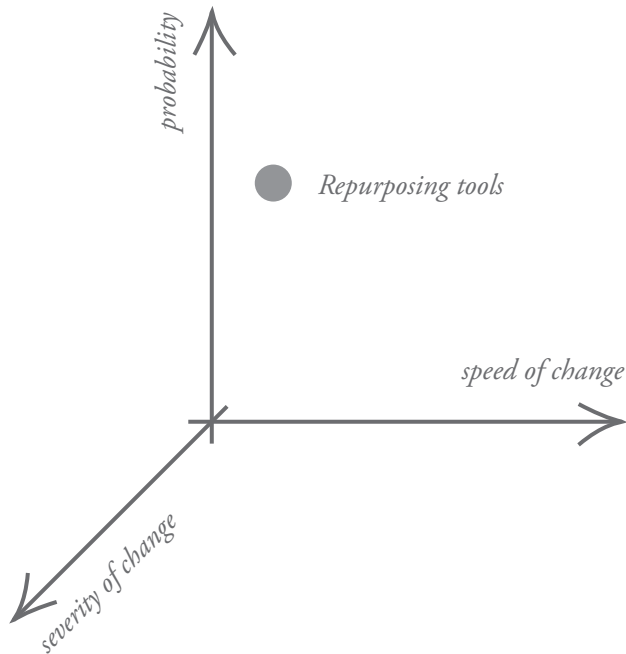


dependencies from one another. In that sense, the definition is close to what could be said of ecosystems in a wider sense: species that care for one another, knowing their survival depends on them belonging to the group and exerting positive impact. Is community the translation to humans of the hot topic of the time: the ecosystem? Funnily enough the aforementioned dictionary describes ecosystems as such “all the living things in an area and the way they affect each other and the environment” [61] Add the notion of impact to the definition of community¹⁶ and our new scale of action is a one size fits all: the care for the ecosystems via community and vice versa. We are playing the same card, the same narrative. [62]

The overall avoidance of further defining what is commonly understood as community has an important value: it does not give it limits and thus virtually encompasses all of the key nodes or people involved, even if those are unknown.

Still in practicality a community will not save itself from the disruptions just because it is a community. Sadly, it may replace the metropolis but not the good old “abracadabra”. It serves as a reference for dimensions and type of relationship. Just like resilience, community has a direction: mainly the various and varying objectives of the people/species that form it. For example, a highly privileged community might well create a replica of their microcosm in an expensive biome (or drive itself further into denial) but it won’t have any positive impact on the long-term for itself community. [7] Community does not translate into survival.

16 When thinking about community is often seen as a transformative power: it has an impact already. [31]



Self sufficiency and the individual responsibility

Self-sufficiency embraces a different paradigm from the aforementioned topics. Self-sufficiency is the capacity you have to meet your needs without relying on others, and derives from our shared narrative of individualism. It has a problem of scale more than a problem of direction. When thinking about self-sufficiency, one often thinks about an off-the-grid house, or of a person that has a good job, or of food production at the country level. “All these help, and also instil a sense of global civic virtue, of being aware of the needs of the global village as opposed to our own individual desires.” [11, p. 175] The problem is that it is not going to be enough. And when it is not enough either governments or the people have to take action. “Sadly, a typical politician’s first response to the climate change crisis is to only quote predictions for this century, or even less, and to assume that climate change stops as soon as the IPCC graphs go beyond the 2100 limit.” [11, p. 175] By re-shifting the attention to self-sufficiency, and by creating the idea of autonomy, the system buys itself over time. An intermediary moment when people believe that living “out of the system”(in “excess autonomy”)[3] will make them survive. Because they do not depend on others. That works until those who become self-sufficient understand how much they still need connection to a global context, they still depend on things the global system controls, just because of the scale of the issues at hand.[3] Self-sufficiency does not translate into survival.

3.4. Other heroes

In the world of dangerous in between, three tools can also be found. LCA – life cycle assessment, or the art of measuring impacts of products in CO2 equivalents to absolutely give numbers to things that go well beyond data – for example was first developed in the 1970s for packaging, essentially staying within the industry, as a way to calm the public opinion around issues of waste, of those packaged consumption goods. Already then governments got interested in it but did not go as far as to impose it for it was estimated to be too much work and management to ask for LCAs for every single product. [63, pp. 11–27] One might argue things would be quite different now, had governments had a different idea at the

Imagine what would happen if the IPCC was to run the world: models to plan for the future, ways of sharing information set in place and already almost an overall representation of the world's population into a single group of humans that rely on an extensive corpus of other scientists and actors... What would change, what would miss, what would it mean for humanity?

time. For instance, maybe Minergie extremes as today would not exist, as one would have compared both the operational and embodied energy or maybe we would never have seen a single-use plastic cup.

The idea of “carbon footprint” has an even worse background. What is now considered as one of the ultimate concepts to talk about climate change and responsibilities, was coined in 2004 by British Petroleum. At the time the firm of the green flower promoted the idea with a carbon calculator that became very successful. Beside being a major shortcut (the culprit is not only carbon its adult form CO₂) it had one major problem: “Consumers could now assess the impact they have on the environment, shifting the public narrative about climate protection away from the fossil fuel industry and highlighting the responsibilities of the individual instead.”[64] BP had a stroke of genius: transfer the guilt upon the individual. If it is the people's fault and you use a tool to prove it, they are less likely to come after you. At the same time, you show a deep appreciation for the environment you live in by making people aware of their own faults. It is a win-win-win.

One that is based on our current narratives: individualism and transfer of guilt (BP only provides what you want), focuses on details (one's own footprint in a clear number rather than the big picture of the overall impact)...Such concepts might be very useful as they are widely spread, and can open up common ground for discussions but still have a background that is questionable. Those tools given by a consumerist empire, do they come with strings attached, and we are just not aware of it? Or are environmentalists just extremely creative as to reuse the concepts that the said empire promotes, by returning the gun it holds back in its direction?

The third tool is the package that climate scientists have created: shared models[7, p. 126] of the future, common collection of data, and maybe more importantly an intergovernmental collective that became a key player in politics worldwide, and yet it is not a state. It might still be at its beginnings, and might still be not listened to enough, but its creation and recognition are already a giant step.

Imagine you are on a boat that is drowning because of a hole in the hull. Those qualities are like a wooden bucket. You can either fill the bucket with the water flowing inside the hull and throw it overboard, to prevent yourself from drowning. Or you can break the bucket to get a piece of wood to act like a plug. Or you can use the bucket as a makeshift boat as your ship drowns. Or you can do nothing with the bucket, watching the boat sink. Or you can put the bucket on your head to not see the problem. Or you can use the bucket to take water from the ocean and throw it inside the boat to drown quicker and make your pain shorter.

Each and every single one of the aforementioned topics can be a source of inspiration for action. They might even be very good ones. Indeed they are qualities: words that describe a process in a positive manner. Their problem is a question of clarity. They don't say what they do. For instance, what kind of use do you make of those qualities? Of those buckets?

And so if resilience, desirability, and community all need a direction, it needs to be clarified when talking about those topics. The problem we face now is that those terms emerge, then they get more popular, to finally be taken over in a great variety of ways. Which is good sometimes as it provides room for different initiatives to grow and promotes diversity. The only problem is when two complete opposites are hosted under the same term. Resilience is experiencing it probably most clearly:

1. some promote resilience to promote business as usual – resilience as a way to prevent economic disruptions (a resilient software against hacking for example)
2. some promote resilience to promote a product – resilience as an argument of marketing (by promoting resilient green new housing for example)
3. some promote resilience to promote an accelerationist alternative – resilience as a way to prevent long-lasting disruptions (by developing technologies to leave Earth for Mars for example)
4. some promote resilience to promote self-sufficiency – resilience as a way to survive in autonomy (with a community-level network of people with varied skills for example).

It is possible that multiple contradictory strategies are heralded resilient, but have very different directions. Moreover, the resilient stamp of one might be used by the others to build upon their objectives, layering different directions. In other words, resilience $\neq$ resilience $\neq$ resilience $\neq$ resilience. It is important that we make sure which direction of those qualities we are actually supporting. Whose interests are behind? Where is it going? When is it going there?

Finding and questioning ideas at the margins

3.5. The other ways – those who don't fit the current discourse

Geoengineering

For some, geoengineering is the only viable solution already now. But in a broader context, geoengineering is still not widely accepted, and for good reasons.

Firstly, geoengineering now has no clear definition. It can mean both carbon dioxide removal and solar radiation management (SRM) and everything in between. And so the term can be understood under very different positions ranging from encouraging actions that nature does (by rewilding, planting certain types of vegetation, environmental protection laws...) to full on world scale chemical experiments (sulphur dioxide in the atmosphere, artificial volcanism...). [65, pp. 24–28]

The main arguments of people who advocate for it, usually in the more drastic version are that it is the only strategy that is quick enough, the only strategy where we are sure it actually works [52, p. 107], or because the capitalistic system would force such a solution. For example, solar radiation management (generally emitting sulphur dioxide in the atmosphere) would make it possible to create “designer climates”, as the possibility to control climate might be used for other things besides reducing global warming [52, p. 153]. Finally, others tend to believe that it will happen just because as time goes by, and problems get thicker, what is acceptable can shift as one realises the importance of what is going to be destroyed otherwise. In such cases, geoengineering might be perceived like the last resort to save what there is to save. But it just happened because we were too late for other measures.

For Holly Jean Buck, as “climate change is a problem of carbon stocks, not carbon flows”, “wait-and-see is actually a recipe for disaster”. “It doesn't make sense to wait and see if it's needed” carbon dioxide removal is needed. But for solar radiation engineering, wait-and-see is to be advised. [65, p. 25] “There are crucial choices to be made about how it is

*alternative have no depth, that is why we are scared of them
but if we create depth it may change a lot...*

done. For most climate engineering techniques, what is outrageous inheres not in the technology, but in the context in which it would be deployed.” [65, p. 26] In other words, the way that geoengineering might happen will play an important role in making it OK or catastrophic. One might think about what would happen if it was deployed in a hurry, by the choice of a few powerful individuals of the west, or what would happen if it was there mostly to serve the capitalist system, a service offered by a start-up... Plus it should be avoided to try and save our issues with a single silver bullet, as it might do more harm than good. [66]

A vision on how it might look like can be found in the first part of the book *After Geoengineering* where you switch in between pages as you choose one or the other scenarios. Or in the book *The Planet After Geo-engineering* by Design Earth. [67]

Degrowth

As I wrote this title, it instantly got a red wave beneath it. As if it was sitting on a fire line, ready to be eaten alive. Apparently, it is not a word that exists. Yet you are then proposed the alternative choices of growth and regrowth. Degrowth is just as badly connoted for my computer as it is in mainstream discourse. Neither of whom can fully imagine the possibility of degrowth. “To be clear: degrowth is not negative growth.” [30, p. 9] But because we see a lack of growth as a loss and little depth to the concept, it is not yet seriously envisaged at a large scale.

As seen above both community and resilience are only qualities that can apply to any direction, and so they are per se not the solution to our problems. If they are to become those solutions, they first have to orient themselves in the “right” direction, “Thankfully, innovations that build community resilience are cropping up everywhere, and in many forms: community-owned, distributed, renewable energy production; sustainable local food systems; new cooperative business models; sharing economies, re-skilling, and more. While relatively small and inherently local, these projects are spreading rapidly and creating tangible impacts.” [4, p. ii] According to Miller and Hopkins the solution is community resilience, and the

risk of auto-catalytic collapse

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auto-catalytic solutions?

way to act is to be “Growing the community resilience movement to the national and global scale that’s needed” “By making community resilience a top priority, environmentalists can offer an alternative to the “growth at all costs” story, one in which taking control of our basic needs locally has multiple benefits.” In the end, it is not getting rid of growth. It is finding growth where its direction doesn’t go against that of our finite world. In a way we are creating new ways of growth. New notions of infinity. This time it is not the planet, its resources or its services that are infinite: it is our networks our possible solutions.

The chemistry of new ways

New stories might emerge from a variety of places whether from science fiction – our imagination, from past stories – our history and the ways we analyse it, from our present – our actions, or even basic science. In chemistry, there is a process called autocatalysis: very summarised, it is a chemical reaction where the addition of a solution of 1 A to a solution with lots of Bs, reacts to form more. As until all the solution has transformed to A. It is possible that previous human societies collapsed because of an autocatalytic process. [39] But it is also estimated that autocatalysis is “pivotal” for biological development by “mutual beneficence.” [68] It is a way for development of strength in ecosystems. And if we risk collapse by autocatalysis, we might as well find catalytic solutions...

Other ways

Careful, bulk space for further explorations:

- Emergence, rupture, transformation, revolution is words coming from analysis from science fiction. [69, p. xiv] They might give us new inputs as to which ways we want to go...
- “Future imaginings can thus be thought of as a process for developing adaptive capacities and emotional resilience within changed environments.” [3, p. 522]
- Other “forms of knowledge conveyed a wisdom that ‘emphasised the symbiotic character of man and nature’” [1, p. 87]

“On screen, climate devastation is everywhere you look yet nowhere in focus, as though we are displacing our anxieties about global warming by restaging them in theatres of our own design and control – perhaps out of hope that the end of days remains “fantasy”.

[52, pp. 143–144]

Those new ways...

What is sure about the new ways is that:

- They will require massive social action. It is not the action of a few communities that will deliver the substantial needed change. The weight of our resilient problem will necessitate many hands to be lifted up: and some hands are stronger than others: government, big industries...
- We need to rewrite our own stories. Because much of what we believe is normality has shifted already or will do so very soon. Many of our values are not tenable or defensible any more, but we still commit to them because it is a safe place. If we want to change, we will have to find room to do so and this also means creating room in our narratives.
- Whatever happens, whether we do not do anything or we actually act, everything will change. [41, p. 1]

Changing the narratives

3.6. Our new common stories

what our imagination tells us

Imagination has no limits: shifting from a world view of constant growth and endless resources to a world view of constant limitations will require the shift from action to thinking. We won't have the energy or the resources to support many actions and as such they will have to be chosen carefully, well designed and studied. And the study via imagination makes it possible to test ideas with very little energy and resources required. [14] "Future imaginings can thus be thought of as a process for developing adaptive capacities and emotional resilience within changed environments." [3, p. 522]

In fact, we might have to find a new source of limitlessness. And seeing how now the stories we tell in mass are usually remakes, repurposes of older stories, imagination seems to be dying off. Wouldn't it be too sad to lose the one tool we know that actually is limitless? [26]

Moreover, imagination can help us fight off the fact that familiar ideas are always prioritised. It is also possible that collective enquiry of possibilities help form new communities and solidarity from shared imagination of risk. [3, p. 519]

“Imagination can be thought of as a way of seeing, or rather a constellation of a way of thinking and sensing that becomes typified or consolidated in images and social actions, what might be thought of as a collective social mapping.”
[3, p. 529]

what our stories tell us

Amitav Ghosh, cited in *The Uninhabitable Earth* asks: “Consider for example, the stories that congeal around questions like, ‘Where were you when the Berlin Wall fell?’ or ‘Where were you on 09/11’[...] Will it ever be possible to ask, in the same vein, ‘Where were you at 400 ppm?’ or ‘Where were you when the Larsen B ice shelf broke up?’” [52, p. 146] David Wallace Wells summarises the position of Ghosh like this: “Probably not, because the dilemmas and dramas of climate change are simply incompatible with the kinds of stories we tell ourselves about ourselves, especially in conventional novels, which tend to end with uplift and hope and to emphasise the journey of an individual conscience rather than the miasma of social fate.” [52, pp. 146–147]

It would be our optimism and our individualism that prevent us to imagine climate change, and one might argue that this also applies to the major issues cited above: They are all issues that both require massive investment from the entirety of the society, but we are used to narratives of the single hero against a defined villain. And the issues at hand are not like the stories we are telling ourselves in novels, books, movies, games... To tell new stories, and plant seedlings of new narratives via those stories, requires a new vision of collectivity and complicity to fight the hero narrative. And it requires a new vision of nature and the relationships we have towards it. Nature in stories often represents another kind of threat, we need to disentangle that to create new stories around climate change especially. [52, pp. 146–151]

For Neurath, cited in *Half Earth Socialism*, utopia is an act of social engineering “scientific work preparing the shaping of the future.” [7, p. 98] Still for a utopia to work it needs tools: planning, transport, stories... [7, p. 99]

Actually trying to change the narratives

3.7. An attempt at creating tools for rethinking our shared narratives

Creating our new shared perspectives on the world around us requires a common ground for them to be discussed. The foundations of those new narratives can be data¹⁷, but also intuition, experiences, images, stories, inputs from other societies, maps, diagrams, videos, exhibitions, collective actions... There are almost endless possibilities, for the purpose of simplicity understood under the term “document” below.

One of the most powerful probably being science fiction: The reader is invited on a journey to a different world for a little while and this experience can serve as a common ground for discussion between people. The goal of the science fiction story might be simply to describe an alternative world, that can for example serve as a backdrop to a certain relatively unrelated story. Or “the text [can act] as a document of an uneven future but one that also gives humankind strategies for survival.” [69, p. xiii] This is the case of the collection of selected science fiction upon which Uneven Futures commentaries rely: the chosen stories provide inputs on how we could change to face what comes ahead.

If one imagines tools of rethinking as either:

1. describing events or causes that lead to alternative concepts (ex: scientific data)
2. describing alternative contexts (ex: maps of higher water levels)
3. providing advice on how to act in new contexts (ex: images of walls, artificial cliffs dropping straight into the ocean)
4. questioning the shared narratives we have (ex: paragraph interrogating the unit of sea-level rise).

It can almost be anything, that is the beauty of it.

Maybe more importantly than the characteristics of the type of “document”
¹⁷ but data alone is difficult to apprehend for many people

would you rather...

ment” is the fact that such a tool needs to question perspectives we take for granted. For instance, we assume that Europe will experience a hotter and drier climate in the future, but that is not necessarily true. If the Atlantic Meridional Overturning Circulation (AMOC), the ocean gyre commonly referred to as the Gulf Stream by a shortcut, was to stop, it could induce colder temperatures. [13] How could a “document” question our vision of a hotter Europe? [70]

As my interest grew for such “documents”, I wanted to try to develop ideas on other ways it could look like. It resulted in a card game and a collection of drawings showing a similar location under varying futures. In both cases, the focus is not on providing solutions or alternatives that are applicable in the face of disruptions. Inversely it should serve as a starting point for creating new narratives.

Playing

When thinking of ways to engage people in informal discussions, games are an interesting resource because they can take many forms and be addressed to many different kinds of people. They can summon stories of competition against the game and each other, cooperation with the game against one another, or cooperation with one another against the game, or cooperation against another team; stories of survival, of rapidity, of dependence, of autonomy; stories of then, now or later. By doing so, games create alternative sets of narratives that can be used to reflect on our own. Moreover, they tell us stories of different imaginary worlds, as the stage is set on the moon, in the Middle Ages or in a fantasy society.

The Dangerous Trade-off Game

This game’s purpose is to instil a narrative of trade-offs to the player in order to re-think the narrative of growth, with a ”game of would you rather..”. It is the story of our world’s limits,¹⁸ where each player has to face the difficulty of choosing and defending the choices he makes in front of

.....
18 Our world being a conglomerate of the planet we live on, our economy and social systems.

In the holistic book Half Earth Socialism, the authors analyse the issues we face and propose a new way of thinking about our world to reduce most of our problems. They explain their 4 points model and show one of its possible applications in a utopian-like story time at the end.

1. *Rewild half the Earth—to protect biodiversity and ecosystems so they are both healthier and more protecting for us.*
2. *Shift to worldwide veganism—to free up space to rewild and prevent zoonoses from spreading*
3. *Set up energy quotas—to make sure everyone has the same chances to “develop” but the overall emissions and land use stay low.*
4. *Strive for socialism—both with a planned economy for redistribution and care for all*

At first it seems rather utopian as a whole. And depending on whom you discuss this with it is one or the other point that seems the most problematic, never quite the same answer is given and yet it always seems impossible.

And yet, my great-granddad was the perfect half earth socialist. Fighting for socialism, he acted for sharing, was not a vegan (I don't know if in 1920s Switzerland you would have survived being a vegan) but already a vegetarian, and part-time farmer, part-time community builder. As for energy, the aftermath of wars made it limited anyway.

Putting known faces onto concepts makes them come true. And ideas as crazy as one of such a society, don't seem as crazy any more.

If he could imagine a better society back then, why couldn't I?

others. There is no right answers, just two opposing polarities that require a good lot of arguments. Trade-offs are something that we, as individuals of a wealthy society, usually have to do essentially regarding questions of cost and time. The question is simple: do we have enough money to this or not? Do we have enough time to or not or is the timing right?

Yet bigger trade-offs do get dealt with in our society, just generally at the scale of corporations and states. They can be valued in money or time currencies but also sometimes rather in natura, without those currencies. As all the issues are connected, those trade-offs are usually entangled within a giant web of interdependencies and blurred by society's narratives. What if we relocated those big debates to the choice of the individual. The resources are limited, how would you use them?

The game has an important bias: it does not tackle the competition narrative. Instead it dwells in an uncomfortable in-between at the crossroads of individualism, competition (there is only one winner) and cooperation (a few players might well collaborate to make sure one of them wins). The “storytime extension” goes even further into this intermediary space as there still is a winner, but the result of the game creates a story in which all participated – either by building opportunities or denouncing problems to be tackled.

However, the game might as well redeem itself by creating awareness of other biases one might have. For example, depending on the way the game is played, one might come to advocate for a position clearly not shared. This might induce “perspective taking” one of the active strategies that can be put forward to prevent bias and stereotypical habits, as you are forced to look for reasons why this position should be promoted, and so one is forced to better understand the position of others. [71] Alternatively, one might choose to inform oneself on the topics and positions at hand. That might happen because of a competitive mindset, nevertheless would increase the knowledge around those topics and raise awareness of the issues which could also reduce biases.

High up, in fact always higher up, in the Goms valley, as the Rhône's creates its first currents, its first waves and its first sounds it has just got out of a glacier. This glacier is one of the sand hourglasses of the region, the excuse to tell a story from a different time, whether that'd be in the past or in the future. It is the place for the: 'When I was young, it reached up until here' or 'I wonder if your kids will ever see it'.

Drawing

Another alternative is to turn data into visual representations or re-localise and re-contextualise global changes on a local scale, so one can identify with it more closely. Especially as the issues are global, reconnecting with the scale that one knows can ensure better understanding of what is at stake. Here drawing can play a big role in depicting change.

Goms valley's futures

The idea behind those drawings was to visualise what changes (in climate especially but also in biodiversity or infrastructure) means. What would it actually look like. Of course there is not an single possible future for a chosen location and so having multiple comparative drawings helps better understand the breadth of possibilities. For some futures, however much action one takes at the local scale, we won't have any influence on them. They will happen regardless of any measure one might undertake. For others, we might actually have an impact.

The purpose is neither to find the most probable nor the most severe, nor the best scenario. It is just to stop a minute to re-understand that there are many ways change might actually manifest. That maybe not all are drawn and maybe that some are always going to be missing, because we could just not expect them to happen. The goal is to enlarge the limits of the common ground for discussion. That way measures can be defined by the scenario they apply to, so one understands in which future context it would be inscribed in. Similarly it might may be clear to which futures it respectively does not apply and think about the consequences of those two cases.

“We no longer have the luxury of viewing mountains simply as spectacular scenery or as goals to be attained by strenuous physical effort. They are certainly special regions, but they are places where communities have lived for centuries, and where environmental sustainability is a matter of survival not just to those who live there but to the many millions more for whom they are just a hazy blue line on the horizon.” [72, p. 4]

4 Alps and the new paradigm of resilience

Initially the context in which those thoughts would crystallise was supposed to be the Alps. Yet as the issues outlined until now concern mainly the global world as a whole, the relationship Alps-disruption is not going to be looked at in great depths here but will be part of the continuation of the project.

The initial focus on the Alps had four main reasons:

Firstly, it allows for an inclusion of these thoughts within an already existing field of research. Especially in Switzerland, the corpus of research regarding mountainous ecosystems and alpine forestry is well established.

Secondly, mountainous ecosystems are already acknowledged for their fragility. From reports and books from the 1990s to news from every summer, the discussion of changes is present. Permafrost melt, glaciers disappearances, hydrological changes, disruptions of traditional agriculture, rural exodus, alpine lake bursts, and changes in vegetation all are part of an awareness to the fragility of these rich ecosystems. Moreover, mountains are important regions of the world upon which many people depend, especially for water cycles and biodiversity [72, p. 29] and it is estimated that 25 % of the global population lives within or very close to mountains. [72, p. 16] Yet those populations are at risk: “Mountain communities are highly exposed to multihazard events. For example, earthquakes may trigger secondary cascading hazard processes (such as avalanches, landslides, and rockfalls) that can have strong negative impacts at local levels (Gardner and Dekens 2007).” [73, p. 25]

Thirdly, there is a geographical closeness to the Alps that makes it easier for the continuation of the master’s project in context. This also allows for a different kind of knowledge than the data of scientific experiments – the stories of grandfathers or experiences of a summer.

And lastly, there seems to be a difficulty in discussing those questions about other regions more populated regions – like the Plateau, when staying in Switzerland. There, the changes are not yet visible enough, not

Not enough people have ever slept outside when experiencing a storm. This means we do not know inside our bodies how it feels to be scared by nature. All of the few of us who have ever been in the mountains when lightning hit, will understand what i mean. The danger to your life is everywhere, and your single way out is to reach the safety of a hut (and even then you will never be fully protected by extraordinary evet such as landslides).

Promoting climate change is the act of destroying that hut while at the same time adding electricity to the air.

Not enough people have ever experienced the sheer anger of lightning in the mountains.

Otherwise we would all know we'd better not destroy the hut.

clearly attributable or just too “close to home”. We are not ready to accept the fragility of the place we live in, to the contrary of peripheral ecosystems. It seems the Alps are just close enough for us to wonder what might happen, and yet just far enough for us to not care too much and fall into instant denial because we hold on to them too dearly.

Mountains represent(ed) unknowability, harshness but also resistance and formidable adaptation... [74] Maybe to find out our new stories we need to meet back with them on that level. They might be the place we first experience drastic change, they might be the place we learn first, they might be part of the solution.

4.1. Strength of the ecosystem in the long term?

Under our latitudes, mountains are the first experiencers of climatic changes and their difficulties. Could mountains become safer ecosystems to live in in the long run? It can be the case, but it can just as much not be.

Many changes in mountainous ecosystems are transient. It concerns specifically permafrost and glaciers melt, as well as the related risks: glacial lake outbursts, high water levels, landslides following permafrost thaw. [72, p. 38] Those changes imply significant hazards but are not going to last forever. [72, pp. 35–38] There is a phase when the old disappears and the new comes. When we think about climate change in the mountains, it generally stops when glaciers are fully molten away. But it doesn't mean that the ecosystem has undergone all the change it would.

Imagining that change would stop at that stage would mean a relatively secure place to live in. Temperatures would be lower than in the plains, maybe more adapted to live without experiencing heat waves all summer. Moreover, the multiplicity of altitudes and their respective microclimates could promote diversity rich ecosystems to sustain the people living in the mountain. And the topography of the small mountainous valleys could provide for easier water collection.

In fact, one of the bigger threats to mountain living is the shift from the glacial (out of ice) and nival (out of snow) water regimes to essentially only a pluvial (out of rain) regime. This would have massive implications for the liveability of mountains as there would be no more constant sources of water. Moreover, extremes in weather events related to the water cycles might move towards each unsafe end of the spectrum: too much water (+ landslides, erosion, floods...) or too little water (+ drought, fires, erosion). [75, pp. 54–56] Both not being exclusive, they could alternate on a monthly or yearly or multi-year basis. If hotter the risk of bigger fires will increase a lot. [77, p. 495] Until then a major risk is looming on the mountains: the failure of permafrost that can occur before significant melting. [77, p. 218]

This would not only have an impact on alpine agriculture but also on all

the infrastructure found in the mountains, from the production of hydro-electricity to roads, passes and train tracks. [72, p. 49] [8, p. 21]

Moreover as those changes continue, they might take a strong toll on the biodiversity that today is rich because of the numerous different microclimates found in the mountains. This is especially true as “warming trends and anomalies are elevation dependent, where increasing temperature has a steeper positive gradient in higher altitudes.” [72, p. 60]

For instance, it would be conceivable that both the treeline ecotone and alpine-nival ecotone would “jump” 800 to 1000 m in altitude until 2100, as overall temperatures increase. This would assure a very different landscape, as trees would be able to grow at heights up to 3300 m in the Alps, but also because the actual migration of trees over such a distance might take a while and would result in intermediary stages where trees low in altitude die because of the new conditions, and trees in the high altitude simply do not grow rapidly enough for them to protect the unstable slopes in draught and intensive rain scenarios. As the ecosystem changes way more slowly than the temperatures, humans living in the alps could experience an increased risk of weather-related events. [77]

And yet not everything is about climate. Mountain living also implies being hit by globalisation, amenity migrations as people move to the mountains to find back “a paradise on Earth” and resource scarcity, which might all make it difficult still to live there. [72, p. 52]

The short answer as to whether mountains will be safe in the future, it is that there is no way of knowing for sure. They might be safer than the plains, but we know neither how the one, nor how the other will change. This is no surprise: in a non-linear world, where unknowability reigns as an almighty master and the stochastic human behaviour plays an important role; there can be no certainties.

All scenarios are possible. And if all scenarios are possible, how do we prepare? Do we plan for all at the same time? Or do we take the risk to bet on one?

“Adaptation is defined, in human systems, as the process of adjustment to actual or expected climate and its effects in order to moderate harm or take advantage of beneficial opportunities. In natural systems, adaptation is the process of adjustment to actual climate and its effects; human intervention may facilitate this.” [8, p. 5]

“climate adaptation is oriented around ways to maintain our current societies as they face manageable climactic perturbations” [11, p. 6]

“Such adaptation strategies and proposals raise questions about the necessary connections and relations that might actually facilitate ‘survival’.” [6, p. 524]

“Adaptation, in response to current climate change, is reducing climate risks and vulnerability mostly via adjustment of existing systems.” [8, p. 20]

“Adaptation must be a crucial part of development strategy.” [72, p. 66]

“Resilience and preparedness, as discussed above, may not be best realised – or imagined – through depoliticised capsules for survival, but rather through more thoroughgoing encounters with the social and political connections that make survival and adaptation possible – and ethical.” [3, p. 524]

At what scale adaptation is viable, and at what scale it is an excess of autonomy that is actually detrimental?

Is it enough to adapt architecture?

5 Our story of architecture – killing the heroes

Architecture where are you then? Good question. Maybe nowhere. Maybe everywhere. In a world of disruptions and new stories, what is the role we want to give our buildings? Our infrastructure? Architecture is part of the new stories we want to tell. And so we have to imagine ways it could be.

5.1. Timescale of architecture

Buildings are elders in a society of constant change. They generally outlast ideas, as ideas shift from generation to generation but buildings essentially stay the same. They might get the usual retrofit from time to time, and some unlucky ones (sadly increasing in number) are prescribed with a death sentence. Overall, buildings last at least a few decades. In Switzerland for example over 60% of the building stock is over 40 years old. In Basel Stadt, it is 85% and Aarau does even better as it is one with the most dwellings and a whopping 44% are around 80 years old (<1946). [78]

And yet if one could imagine a building of today living in a new context 40 years from now, what would it look like?

The first instinct is to think about climate change exclusively, and especially in its translation into weather, and wonder if it won't be too hot inside. Maybe the second instinct, to say we'd rather not put any heating inside anymore at all, or that the law should be reversed so that having a heating source would be prohibited and getting an AC would be common.

But what about water, plants, energy? And what about the norms and finances that will regulate the future developments of those buildings? Are there still going to be building codes? Will it be absolutely forbidden to build anything new? Will the rules of our world be very strict and cover all aspects of life or will it be the opposite?

And what about the other issues? About inequalities, if they keep increasing who will even afford to be living in them? And how would they be lived in? What would be the origins of the people living there? From Palikir in Micronesia, Dhaka in Bangladesh, Lusaka in Zambia or New York

The buildings of the future seem to require a robustness that is made of both the flexibility of the tent, and simultaneously the protective strength of the castle.

in the US? Would it be an overwhelming majority of elder people, the last generation where there were multiple kids in each family? Would it be somewhere where having something of one's own does not exist anymore? Will there still be people who will live in those buildings or will they have all left for distant places, maybe more safe?

Even worse, what happens 80 years from now? It even goes beyond all the IPCC model simulations.

And maybe more importantly: is the building and infrastructure stock going to be an advantage or a disadvantage for future populations?

As of today, the construction industry did not escape the obsession with complexity. What we build, what we transform and maintain is complex, energy consuming, and machinery is difficult to replace with people or animals (or even just less complex technologies than the crane and the CNC). We value labour efficiency over material efficiency. And so our beams have increased in weight so much so that no group of humans would be able to repair it.¹⁹ Our buildings require complex models to be working, so many fluxes they host. They necessitate competent people who were taught how to handle electricity, efforts, water in our slabs, gases in our equipment... Who will repair? Who will care?

If one assumes that the constructions we create have a life span ranging from fifty to a hundred years, chances are they will experience those disruptions. The question of their role is then: how do they respond to their new environment and socio-economic conditions? And leading to that are numerous smaller questions: how adaptable are they to those changes? Are they strong enough to withstand change but will wither with time as we do not have the energy to repair them? Are they light and fragile but repairable?

.....
 19 For example, just take the train from Renens – our today – to Lausanne – our yesterday. The composed and elegant trusses of the railway station of Lausanne, even kids could help maintain it. You would need heat for riveting maybe but nothing in comparison to some other technologies. In Renens 15cm diameter posts are used. There the day we don't have energy or technology will mark the end of the building.

“our culture, like our politics, specializes in assigning the blame to others – in projecting rather than accepting guilt.” [52, p. 144]

5.2. Responsibility in ecocide

Shift in values have happened all over history. In fact, history is constantly being rewritten: as ideas change and values shift we rethink the events and reasons differently. What was once normality becomes a crisis. We have seen this already. But what does it mean for our current practice?

There is one major take-out: there is nothing stable about the way we perceive our acts. What are future generations going to think about, when they see what we have done? Will they be impressed? happy? repulsed?

Maybe one day we will wake up and be told that what we do is unacceptable. In his book *Climax Change!* Pedro Gadanho dedicates an entire chapter to the “weapons of ecocide” [53, pp. 62–79]. He argues that those are concerns we need to think about since architecture was a major driver for the use of certain materials, in the changes of land use, the disruption of natural patterns as well as responsible for much of the greenhouse gases emissions and pollution.

Moreover if soon enterprises could face liability risks or how investors (or population) could turn back to non-environmentally friendly businesses and ask money in return[9] (or something else), what would they think of our practice?

“The Industrial Revolution made a nonsense of many of architecture’s truths that were distilled in art and ornamentation.” [14, p. 151]

“Only vigorous debate about the nature of functional design in energy descent can expose the dysfunctional forces driving design of our inhabited landscapes and built environments (see Principle 3. Obtain a Yield). However, any wholistic design will include an aesthetic aspect. The creative tension between function and aesthetics can be seen as analogous to, or even a subset of, that between materialism and spirituality illustrated in Figure 5 (see Ethical Principles).” [14, p. 151]

“Just because Permaculture emphasises ecological and human scale functionalism does not mean that aesthetic appreciation has no place in Permaculture. A positive view of the ecological role of aesthetics suggests that it represents the distillation of the essence or truths of a design culture in forms that have a sensory and inner (spiritual) resonance. Once the bioregional patterns of modest ecological design become established, we will see the re-emergence of bioregional aesthetics that act as a type of design shorthand or signature. Aesthetics in this context can be seen as distilled patterns specifically attuned to human sensory response, which reinforces the recognition of appropriate patterns. In the transition from growth to descent, much of our task is to find the appropriate patterns.” [14, p. 152]

“Crise’ vient du grec krisis, qui veut dire à la fois “dénouement”, “décision”, “élaboration d’une opinion”, “choix” et “jugement”.” [79, p. 15]

“Scenarios such as that of banning new construction apparently go against the grain of architectural desire. And yet, we may come to realise that these scenarios trigger new design problems through which architects can uncover new, unknown pleasures – but also, as early modernists knew well, rediscover the creative climaxes of addressing higher transformative goals.” [53, p. 18]

5.3. Curing the illness of 21st century architecture

Architecture has a problem. It is an in between. The construction world as a whole is an in between. What once was a field that took a holistic approach by connecting economical, social and environmental concerns, for example with the traditional and vernacular chalet,²⁰ has come to detach itself from some of those concerns. A switch towards a more economically centred approach that impedes on the concern of environmental responsiveness (response to the local climate, material resources, natural flows like water and air).

There is the need to change but we think we do not know how: we focus on commentary rather than actual creativity [26] In fact there are solutions that are being proposed especially in science-fiction which proves to be an incredible source of alternatives. [1, pp. 112–128], [3], [80] and solutions that are being tested out. Our conservative sector that has to be modified. [53, p. 43]

How do we do it?

One might argue that, reduced to its basics, architecture is simply a transformation. It is to make an adequate change in the environment. And it usually serves to shelter someone, represent something, evolve sometime. Maybe we need to restart from there... Not run in circles of references.

20 One might argue that architecture is never fully whole. Never quite the synthesis of all the environmental, economic and social aspects but rather of smaller chunks of those interests within either one or multiple of those fields.

“At this moment, we scarcely need to invent another obscure theoretical excuse to make architecture originality leap forward.” “In a moment of growing anxiety, the next formal or spatial cheap trick is not what will make the profession relevant for society.” [53, p. 19]

“Looking at the scale of transformation implied by the coming environmental crisis, we need to revive the spirit that once drove the avant-gardes. We need to redirect that creative energy at the issues that are now proving to be inescapable – as war, rapid urbanization or technological breakthroughs were in the past.” [53, p. 19]

Stop building buildings – start building communities?

Is it humans or moss and lichens who will take care of our buildings in 80 years?

“The new hot question, alas, was why is it so difficult to start addressing inevitable change in architectural practices.” [53, p. 42]

We need to recognise “how much our lives are intertwined with those of millions of strangers.” [26]

“As one comes to the realisation that many of the cherished principles driving architectural conception may be proven aberrant by environmental concerns, it is naturally tempting to keep these at bay for as long as possible.” [53, p. 52]

Ecocide does not yet belong to our concerns. “But in a bewildering scenario, as the recent political response to the corona virus outbreak now oblige us to consider, this may well turn into an ecological witch hunt with unexpected effects.” [53, p. 78]

5.4. Architecture’s predisposition

As engineers and architects we are used to plan for the future. Probably more than in many other fields: we know that what we do will last. This we can perceive even in the time invested in the development of a project, especially in grand infrastructures. The planning and construction phases already take years. Even with all the new technologies and the oil, it still takes time. For instance, it is estimated that 1 barrel of oil equals to 24’000 hours of work for a human or 11 years of work at 40 hours a week. [2, p. 242] That way the use of oil and other energies increased dramatically our rapidity for construction, and yet it still takes time...

So we are used to looking into the future to find our answers. But maybe we have forgotten how to look. And maybe we are trying to find a single answer. An answer told by our current story. An answer of progress. And yet one can wonder: are there other answers?

To plan

The situation will require planning to get us out of here alive. If we need to work towards certain goals, whether those would be the eradication of inequalities, the dramatic reduction of emissions, the liberation of massive territories to rewild, the creation of a new economic system... we will need a plan – or multiple. Without a plan, priorities cannot be set. Without priorities, trade-offs, the new paradigm of our time, cannot be solved. Without trade-offs chances of survival decrease. And they decrease exponentially as time goes by. The design of strategies becomes paramount in a world of trade-offs.

It is easy to imagine that if we want to turn the entire system upside down, we will need planning. You cannot create a new way to make 8 bio people live on earth without a plan. What is less obvious though is the fact that we also need a plan if we continue with our current institutions.

Why? Because our economic system, neo-liberal capitalism is by default hostile to planning. As planning involves rules and the influence of a deciding organ, it goes against the freedom herald of neoliberalism: the

“The nearly ubiquitous belief of our elected officials is that addressing the climate crisis must come second to ensuring economic growth. This is wrong-headed – both because it underestimates the severity of the climate crisis, and because it presupposes that the old economic “normal” of robust growth can be revived. It can’t.”[4]

invisible hand. That this invisible hand could be impeded in its action or become visible is untenable for those who defend this system. If the economy, in its old Greek form meant the rules of the household, it has changed drastically and our version of an economic system does not know how to plan and set rules. [37, pp. 42–49]

This means that whether or not neo-liberal capitalism is pursued, if we want change, we will need planning. We will need to take action. Waiting for the empire of capital to magically start planning is pointless. When neo-liberal capitalism experienced crises, it did not tried to act: it was forced to do so, when already on its knees, by governments. [2]

So we need planning. And what do engineers and architects do? They plan for the future. And adapt their plans as they go and new inputs come.²¹ They are not alone: the tools given by maths, physics, chemistry, biology, economic studies, sociology, psychology and many others. Clearly the kind of planning required goes well beyond what is usually expected from those fields. Not necessarily because of the time frame – we are already late. We have to act very quickly – somewhere in the range of the single decade – which is the time frame we are used to. [81], [82]

It goes beyond the scope of those fields because it requires way more cooperation in between fields but also outside. It needs to reach people and politics and coagulate with them. Planning, just like creativity, is not sufficient if it never turns into action. What we need is not a bridge to renewables: it is a bridge in between people to make the relevant changes en masse and in dignity.

21 For example delays and missing resources have to be accommodated. It is part of the job, and a training for flexibility.

in light of the new narrative of the ecosystem as a whole, where everything is connected:

what would a new definition of a building's envelope be?

*we already take into account the thin still air layer around a building for thermal resistance calculations.
would we take even more into account?*

would we have new versions of the scottish castle inhabited walls?

Nevertheless, such resources will be of determining importance if our goal is to reduce the amount of disruptions we could potentially face. For the planning, more and more ways are being created, with small initiatives popping up everywhere. Many small initiatives that grow simultaneously. They will need coordination and support.

As stated by Holmgren, one should “encourage(s) small-scale, nucleated development that mimics cellular growth” in the way that “successful gardens do not keep expanding. Instead, they provide a surplus of plant stock and knowledge that help to establish new gardens.” [21, p. 138] In other words, how do we start an autocatalytic process to get us out of here?

To see the futures

There is a reciprocity of architecture and imagination:

- architects can be vectors / catalysts of imagination to prepare people/communities for uncertain futures and to reinvent themselves in the face of disruptions
- imagination can help architects to design according to uncertain futures and to reinvent their practice in the face of disruptions

This reciprocity is an important tool because it allows for unexpected solutions, which is useful in times where the problem is just as unexpected.

Imagination can help, especially by broadening the range of possibilities from the one that is currently accepted and thinking about issues that would not otherwise be thought of.

“To open up what is possible above all involves imagining past what we are losing to anticipate what might emerge.” [1, p. 121]

6 Conclusion

Architecture as a profession must die.

The society that promoted our appearance might soon no longer have enough resources to sustain us anymore. We have seen above that for our society to offer certain services to its people, it needs an EROI bigger than 12:1. Given the fact that oil's EROI constantly shrinks down to approach more and more the threshold of society's necessary EROI, and that alternative energy sources strongly depend on oil; it certainly is not impossible that we would go below that 12:1 line. The problem of being below the line, is that it is like being in a hot air balloon running out of fuel: you have to let some weight down. In the case of our current society, it would mean giving up on some services that society now offers. Which of those services are we going to choose? Who are the people that will have to become recyclers, farmers and carers instead of doing what they previously were doing?

I would argue that architects do not have an indispensable job, and would be some of those who would . Firstly, worldwide there is still an overwhelming majority of auto-construction and auto-retrofit. People have been doing it since forever. People are doing it now. People will do it tomorrow. They will build for themselves, with the local knowledge they have, with the local materials, and with the local sensitivity. And one might argue that they are doing it better than we are. Otherwise, why would we all be obsessed with vernacular architecture? Because they were doing a better job at the synthesis of all aspects encompassing architecture. Because they were not experiencing the distortion and bipolarity of modernism. Because they understood that a building is not to be detached from its surroundings. It has to have roots, roots like us humans have. Because the narratives of those traditional buildings once again fit ours: we know we need to change, we know we need to use less to do more, we know they were better at dealing with the issues we face now.

“With information overload sometimes comes painful enlightenment.”
[53, p. 43]

Secondly, because according to the way we will probably be perceived by future generations, we did our dispensable job badly. We created segregated spaces. We created hypes around unhealthy materials. We have gotten high on finding form, but low in finding roots. We have created monsters that will kill us if we cannot repair them: high rises, dams, thermal power plants. We perpetrated the ecocide. Worst we did it willingly even if maybe unknowingly. We thought it would be of utmost importance that there would be architects involved in the process of the transformation of space, because we were scared of the real estate. And somehow it might have been true: the marketisation of houses, certainly was detrimental to their locality. And maybe even to their quality. But if real estate was so bad, how come we couldn't beat it down, so creative and good at transforming we are supposed to be?

Thirdly, because we are supposed to be the thinkers of tomorrow. We plan ahead, we look into the futures to find our ways. Just as much as we look in the past to find the other half of the answers. It is our duty to ask questions about the tomorrows, even just because our buildings will take an active part in those tomorrows. For better or for worse. If we fail to recognise our incompetence to look into the future today, the only thing we are going to achieve is the deception of future generations. Why can't we have the humility to recognise that we hide behind our heroes of the past by defending the research of form?

If we might be accused of ecocide, if others can do better, then maybe we can become part-time farmer, part-time planners.

When starting to work on the subject, I was surprised how much there was on the topic. Who would have thought that something that felt so unspoken of would be so discussed?

Many think it is very sad and disturbing to think about it, let alone read about it from people for whom those topics are day-to-day work.

And let's just say it is not easy.

But at the same time it can be very freeing.

When you thought you were alone in facing the mourning process of losing all certainties, and it suddenly turns out you are not, it feels almost good.

Giving up on your future before you could get a chance at it, is easier when you are not alone.

This text is a catharsis for me. The way to let frustration, fear, anger and sadness out. Start on a blank slate for the coming events. I apologise if it feels dark, my bias of pessimism spoke louder as I wrote. Nevertheless I believe there are many things that can be done, but the reconsideration of the issues and their appropriation was an interesting starting point for me, to re-enter the question by a different door than the one we hear about all the time: that technology is going to save us. I'm sorry EPFL, it might not always be the case. But if you want to mourn, a collective process at your scale might result in something even more powerful than the creative strength you have now...

EPFL, For what futures do you prepare your students?

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