Crutzen & Stoermer – The Anthropocene

A very coherent and straight to the point article about the impacts of human activity on the Earth system. However, it only presents the "good anthropocene", not going further after the underlying causes of the present situation.

I translated the article to Czech using AI (sorry Mr. Braun) and sent it to my climate change denying uncle, with whom I exchange opinions from time to time. Of course, I did not change his mind, as the information presented in the article has completely different meanings for somebody whose world is drastically different from my world. Our differences cannot be resolved by authoritatively presenting "facts" like these to each other, my mistake.

Law – On sociology and STS

Good intro for STS. Here I made longer notes mostly by copying the essential points from the article and marking them up, as I feel I might use these at some point later on. The same applies for some other articles further down – the ones I took the longest notes from I feel might be of most use to me in the future.

Kuhn's *Structure of Scientific Revolutions* could be used as a licence to conceive of science as a form of culture as opposed to a special form of truth lying outside normal social practice. Second, it attended to the informal and practical features of science. And third, it made its arguments in the form of case studies.
On the one hand sociology has a vital empirical tradition. On the other hand it tends to distinguish between empirical research and social theory. This division makes little sense in STS which develops its theoretical arguments through case studies.30 This implies questions for sociology. Instead of 'applying' social theory or imagining that it is describing the world, would it be better for empirical sociology to reconceive of itself as a case-study mode of carrying and constituting theory? And, a complementary move, what would sociology lose if it were to jettison its propensity to grand narrative?

STS: In theory it might make its arguments in an abstract manner (and there are some signs of movement in this direction), but its major mode of self-expression, discovery and exegesis has usually been through case-studies. STS theory is not first created and then applied empirically. Theory and data are created together.

STS sensibility abstraction is only possible by working through the concrete. Or, to put it more conventionally, theory is done in the form of case studies.

ANT: actor-network theory doesn't really count as a form of sociology. Unsurprisingly, it is a source of frustration for those who seek strong social explanations for the origins of phenomena. For similar reasons it is also frustrating for those primarily concerned with social critique. For instead of asking why things happen it asks how they occur. How they arrange them- selves. How the materials of the world (social, technical, documentary, natural, human, animal) get themselves done in particular locations for a moment in all their heterogeneity. And how they go on shifting and relating themselves in the processes that enact realities, knowledges and all the rest.

Tradition of writing as a modest observer: Haraway notes that the tradition of modest witnessing is gendered,22 but also that despite its self-effacing literary mode, it is also profoundly immodest. This is because witnessing pretends to speak objectively on behalf of (some aspect of) nature by separating subject from object and appearing to make the object speak for itself. In reality, however, it conceals the circumstances (social, technical, literary) that produce this form of wit- nessing and the object that is

being witnessed. Then, and this is the crucial move for our purposes, she proposes an alternative form of modest witnessing that is locatable, responsible and accountable. 'Feminist objectivity,' writes Haraway (1988, 583), 'is about limited location and situated knowledge'. It is about accepting and describing the located character of truth claims. It is about avoiding 'the god trick of [claiming to] see . . . everything from nowhere' (1988: 581). And, since knowing is also about performing, it is therefore about accepting the responsibilities that go with knowing. This, then, is a new kind of located and situated critical project, one that is profoundly political, but not foundational.

Critique of social constructivism:

- Law says that it implies that once structures are constructed, they stay there. So, there is not enough emphasis on change and process –> I disagree, I do not really see this as a problem of constructivism
    - in this (STS) alternative way of thinking, the webs of relations only hold if they are enacted, enacted again, and enacted yet again – which may or may not happen in practice. But if we think in this way then we're no longer on the metaphorical equivalent of a building site. Instead, we are in a world of performance or enactment. It is arguing that realities (including objects and subjects) and representations of those realities are being enacted or performed simultaneously. This means that it is also profoundly non-humanist (beware, performance here has nothing to do with Erving Goffman's sociology).
- Braun says that soc. constructivism tends only to accept that the social world is construed, while the natural world is not. It maintains the subject-object division. I agree.

So what lessons might this material- semiotic STS hold for sociology?
Perhaps the most important is that 'the social' is always material. The two cannot be distinguished, except as outcomes or effects, and it makes no sense to try to do so.

a core concern of STS is with how practices enact representations on the one hand (epistemology) and realities on the other (ontology); with **how methods represent and enact the real**. But we need to be clear what this means. Thus, though they may include experimental apparatus, it would be misleading to imagine that methods are primarily pieces of kit (STS has always rejected technological determinism). Instead, methods are more or less (always more or less!) routinised practices that do reals and representations of reals. These practices stretch far beyond the laboratory or any formal notion of scientific apparatus.31 To put this slightly differently, the core claim of STS is that technoscience does its realities as well as the representations of those realities: that technoscience, in all its complex multiplicity, enacts worlds that are fit for its methods.32 But what happens if we turn this round and apply it to the social, to social science, and in particular to sociology?
One answer is that sociology would be understood as a discipline composed of (theoretically freighted) methodological practices for producing descriptions of reality and the realities that correspond with those descriptions. **Sociology would be understood, in other words, as a set of devices for doing reality.**

Industrial and retail organisations, global finance, state agencies, NGOs and the multiple organisations of civil society – have their own representational and reality-producing techniques. So the question arises: **how well are sociologists currently able to track and trace the realities that these are creating?**

The turn to performativity robs us of the belief, the hope, or the pretence that our methods simply describe. They are not neutral. They help to enact reali- ties. Haraway argues that we need to be accountable for our practices and their knowledges. Following such authors as James C. Scott and especially Timothy Mitchell37 I would add a more specific version of this political question. What, I would ask, is the relation between our sociology and those – often branches of the state – that sponsor it? In what measure might it be argued that sociology in its current versions inadvertently helps to make a world fit for state power? And what would we make of this if we thought that it did?

So I am cautiously optimistic about the creativity of sociology – so long as it is also understood that our methods are, indeed, performative: that they do not simply describe but in some measure help to do the realities that they discover.

On the complexity of the world:
Understanding complexity is not simply a technical task, something to which we might hope to approximate as our methods improve. **Any such aspiration is a chimera because we are part of that complexity, we are helping to create that complexity, and we could never get outside the social to view it from above and as a whole.** To put it differently, our attempts to know and order will be both performative and limited. Or, to put it differently again, looked at from the point of view of a desire for social science order and completeness, **the world is chronically messy and will defy summary in any one particular way.**
So what does this imply? Again we may debate. But for me, made as I am in a particular version of STS, a specific more or less critical conclusion follows. **It seems to me that methods that imagine the world to be relatively neat and tidy and try enact it in that way, are missing the point**. Worse, they are seeking to stipulate and so to enact an order that is epistemologically mistaken, onto- logically unrealistic, and politically obnoxious. I sense this every time I have to fill in a questionnaire. Usually, almost always, it seems that the questions do not quite fit.
And I feel it, too, when I have to respond to social science inquiries about the rigour of my approach to research, to research methods, and to research hypotheses. Usually, for instance, I cannot tell beforehand how the data will be analysed. Often, indeed, I have no idea what will and what will not count as data. The forms of ordering implied in such inquiries do not match the social realities with which I wrestle. No doubt this is sometimes a straightfor- ward failure in my sociology. But I think it is also a failure in how we collec- tively imagine our methods and their relation to the real. **My hypothesis is that our collective understanding of method seeks, albeit imperfectly, to enact forms of order, but that the realities always escape.**
All this leads me to say that we are in need of methods for knowing and enacting non-coherence. Indeed I believe this to be urgent. This is because there is a theory of domination hiding here, a sensibility to inequality that we have not yet quite managed to articulate. **This is that domination is often not a system effect, the consequence of a coherent order. Rather it is a result of non-coherence.** Of elements of structuring, ordering, that only partially hang together. **Of relations of subordination that are relatively invulnerable pre- cisely because they are not tightly connected.** Invulnerable because when one is undone the others are not pulled down with it.
How to think this well? How to interfere in the non-coherent structures of domination? For me this is the great challenge for sociology in the 21st century. I have no answers. But of this I am certain. **Research methods that describe and try to enact coherence by imagining domination as a structured whole count as part of the problem rather than as part of the solution.**

Law – What's wrong with a one-world world

The argument is that in the 'North' we do not live in a single container universe, but partially participate in multiple realities or a fractiverse.

My argument follows a path well-developed by post-colonial scholars. It is that one-world metaphysics are catastrophic in North–South encounters. They reduce difference. They evacuate reality from non-dominant reals. They turn other worlds into the mere beliefs of people who are more or less like you and me – and correspondingly more or less (prob- ably more) mistaken. They insist, in the end, that there is a universe and that we are all inside it, one way or another.

there is no reason to suppose that those performances will all add up to gen- erate a single reality. On the contrary, it seems much more likely that they will fail to fit together. If this is right then we do not live in a single container universe, but partially par- ticipate in multiple realities or a fractiverse.

The Northern world is multicultural, not multi-natural, such is a quick version of the Northern metaphysical settlement.

Blaser – Political ontology

we need to seek a new grounding of possibility and hope, and a new imagination for future ways of being modern

Actor Network Theory: ontologies do not precede mundane practices, rather are shaped through the practices and interactions of both human and non-humans (see Latour 1999; Law 2004; Mol 1999)

One of the characteristics of modernity has always been its autocentric picture of itself as the expression of universal certainty . . . So its history has always claimed to be a universal one, in fact the only universal history.

Euro-modern ontology = various different cultures are all relating to one and the same nature

Hamilton: A fifth ontology of the Anthropocene

"These critics – everyday environmentalists found in suburbs across the rich world – do not declare themselves against modern science, technology as such, or the subject–object split. Instead, they want their societies to adopt more sustainable practices and **use modern science and technology to ensure that a more thoughtful subject gets on better with the exploited object**."

"ontological revolutions take place in leaps and bounds over extended periods, a century or more, and are driven by shifts in intellectual worlds in close collaboration with the changing social and political conditions that contain them."

- I think that this can be seen in slowly but surely prevailing atheism – the carthesian/newthonian ontology took hold step by step, gradually leading us all to atheism which is implied within the ontology. Only a couple centuries after Descartes, we truly adopted his ontology.

As the ecological crisis deepens over the next decades, we can expect to see a dialectical process of social–political change and a profound shake-up in philosophy.
The fact that the Earth's geological evolution is now influenced by a conscious force is of the **most profound philosophical significance.**

I'm suggesting that the conditions of life will be **transformed in a way that renders all existing ontological understandings anachronistic**. And I will suggest that by entering a state never before experienced in its 4.5-billion-year history, the Earth is now something without ontological precedent.

As I have argued elsewhere, the situation is too serious, the danger is too great, for us to indulge in post-modern intellectual games (Hamilton, "Too Serious"). With climate science for years under ferocious attack, effectively enabling the climate crisis to occur, social scientists have an **ethical obligation to refrain from casting doubt on the expert advice of climate scientists.**

No previous ontology has had to build itself around this notion of time, that is, around the human as a geological force as well as a historical one. It is **not equivalent to the "timelessness" of Indigenous cosmologies or the cycles of eternal return**; instead, it unfolds in a single direction marked by a human–nature dialectic of change.

Greta's kind of "hope" is the outward expression of an inner resolve to act, no matter how bleak the circumstances and impossible the goal. **"The situation is hopeless, we must take the next step,"** in the words of Pablo Casals.

The loss of faith in the systems built by modern humankind is a repudiation of techno-optimism because the extreme danger of techno-industrialism has brought us here. **But nor is it a rejection of technology; for a tech-drenched generation, technology must be at the center of any attempts to manage the harm we have done.** Our task is not to deny our extraordinary power and attempt to abandon it but to work out how to use our power responsibly, that is, how to deploy technology and management practices to reach a reconciliation, to calm the Earth.

Rather than denying human agency by emphasizing human integration into the natural world, a fifth ontology accepts that human agency has been super-charged and taken on a geological temporality, even if it has rampaged across the land with self-destructive abandon. **Only an ontology built on the crushing responsibility that goes with the power of our technology can save us.**

Juelskaer, Barad: Intra-active elements

I agree with Latour that critique has run out of steam – it's too formulaic, too predictable. ... it buys into and enacts a linear temporality that closes down rather than opens up what is to come. **Critique may provide some important insights at first glance, but critique isn't an acceptable stopping point of analysis.** It isn't sufficient, and often times it isn't at all helpful politically.

We flourish as a group by hon- oring our differences, respectfully disagree- ing, and working collaboratively with and through our differences. This is hard work, sometimes fun and sometimes painful. It's not utopic, but it's a collaborative alliance with traction. **This kind of traction doesn't arise out of critique. Critique makes people feel attacked. It doesn't focus on living together, hopefully living well together and flourishing.**

The most stubborn of all dualisms – the animate/inanimate dualism – that stops animacy cold in its tracks, leaving rocks, molecules, particles, and other inorganic entities on the other side of death, of the side of those who are denied even the ability to die, despite the fact that particles have finite lifetimes. **Who gets to count as one who has the ability to die?** A rock, a river, a cloud, the atmosphere, the earth? How about viruses, brittlestars and other boundary-crossers?

Responsibility and accountability to/for phenomena are crucial ethico-epistem-ontological matters, where **responsibility, is not about a calculable system of accounting**, but about hospitality as Derrida would have it, about inviting and enabling response. That is, what is at issue is a matter of **responsibility for the violence of the cut** and the co-constitution of entangled relations of obligation.

Some people have asked me if I walk around in the world differently as a result of being steeped in these ideas. And I have to say "yes" with the qualification that I am neither in the ideas nor are they in me. In particular, these ideas are not in my head, rather they are specific ongoing reconfigurings of the world in its iterative intra-activity. These ideas are not outside or inside me, they are threaded through "me" and "me" through them, or rather we are threaded through one another. I think it makes a difference to be attuned to phenomena rather than things, to **be aware of being a particular configuration of the world intra-acting with and being reconfigured together with a world of other phenomena.** I'm not some individual who travels through the world as a fixed entity, as if I were the same here as I was before I left California at the end of the quarter. **I'm constantly being reconfigured. Or rather the ongoing reconfigurings of the world are iteratively remaking "me."**

Berghofer: Husserl and the mathematization of nature

Instrumental to the overall argument in the Crisis is what Husserl refers to as **mathematization**, i.e. the cognitive process that allows us to turn reality into a "mathematical manifold." What remains is a **mathematical formalism that claims to be a complete representation of objective reality**, but that at the same time is entirely disconnected from the world which we directly experience.

Instead of treating these models and their components as idealities that are abstracted from basic life-world experiences, the very point of Galilean science is to reverse the order and let the models become prescriptive for how the lifeworld is perceived. Having mastered Galilean mechanics, then, does not primarily mean to have acquired a particular set of theories or techniques. It means, much more fundamentally, to perceive actual observable instances of flying arrows, spears, and stones as mere approximations to the ideal case that is stipulated by the mathematical model. These idealities (models) become the prescriptive standard for what becomes actually present to us in the realm of simple life-world experience.

It becomes tempting to project features of the model back onto nature itself, and thus to **"take for true being what is actually a method."**
According to Husserl, Galileo confused what is a method to represent reality with reality itself and this confusion was a consequence of the fact that Galileo took the mathematical-geometrical formalism that worked so well for granted and interpreted it as given.

Quantum theory
Bohr argues that **measurement is an inherently invasive process** involving an uncontrollable change in the system under observation.

Danger of leading to a mathematization of nature that is not based on physical principles but on mathematical formalism. Critical voices have pointed out that in these interpretations "the strategy has been to reify or objectify all the mathematical symbols of the theory and then explore whatever comes of the move."

Galilean criteria:
1. determinism (previous state determines the latter)
2. non-disturbance by measurement (an objective view from outside is possible)
3. completeness (it is possible to simultaneously measure all the properties of a physical system)

Quantum implications:
1. indeterminism (the quantum state of a system does not determine the outcome of a measurement, only its probability)
2. disturbance (measurement disturbs the state of a system)
3. non-completeness (it is not possible to see the whole)

- quantum measurements are perspectival; one must always choose what to measure and how. Thus, we always get a distinct perspective on the system. **We only get information about certain aspects of the state of the system. Additionally, one only receives limited information about these aspects.** The agent's choice of initial measurement is directly consequential, both in terms of what the agent does and does not learn about the system, and in how the state of the system is changed following her intervention.

In quantum mechanics the physicist or agent is not and cannot be an innocent bystander that gains a complete and completely objective picture of nature. This is in agreement with the phenomenological picture according to which the subject is an embodied subject that cannot be separated from the world it acts upon. What is more, it is a core conviction of phenomenology that a purely objective view from

nowhere is impossible. “There is no pure third-person perspective, just as there is no view from nowhere.” Instead, “**any understanding of reality is by definition perspectival**”.

Things always “transcend” or “go beyond” the actual experiences that give rise to them. A laptop I’m looking at is always given to me in perspective and it never presents itself to me in its entirety (I do not see its internals, I do not fully understand it, I only get to perceive it partly and from a perspective).

Previous experiences shape the way we perceive. Perception is not a faculty that allows us to see the world as it is objectively, independent from our history, background beliefs, etc. **The objects we experience and think about do not have an objective sense that is for us to be discovered. Instead, we ourselves constitute the sense of the objects we engage with.** Phenomenology is a reflection on the manner in which things come to gain the kind of sense they have for us.

The fact that there is a profound discrepancy between the Husserlian picture and the Galilean ideal does not imply that one of them is mistaken. For Husserl, the discrepancy is explained by the fact that **Galilean mechanics (unbeknownst to Galileo) is directed at an idealization of reality, not at reality itself.**

Hoelle: Placing the Anthropos in Anthropocene

We are coming to grips with the fact that we cannot so easily separate ourselves from our environs, much less exert full control over them. The Anthropocene thus presents a fundamental paradox—with the increased recognition of humanity’s capacity to alter the environment, the separation between the human and nonhuman has grown increasingly fuzzy, and it is unclear who or what is really in control. This is why Lorimer (2012) argued that the **Anthropocene essentially represents the nail in the coffin for the modern dichotomy between nature and culture**.

In Human, All Too Human, Nietzsche (1910) wrote, “Most people are far too much occupied with themselves to be malicious” (88). Our fear is that he was very much wrong. **There is a subtle maliciousness found in the disregard for others and their place on the planet**, and it is embedded in our very limited notion of who counts as human, whose lives matter, and whose lives are treated as dispensable.

Attention to structural change in the present can contribute to “Civilizational Transitions” away from the dominant Western “capitalist hetero patriarchal modernity” toward a more socioecologically just world in the pluriverse (Escobar 2019, 121).
On the other extreme is a world of monocultures, resource extraction, and capital accumulation in the hands of a very limited swath of humanity that is not only a single species but a very limited portion of that one.

Such techno-centric approaches include **geoengineering** as a response to climate change (see Keith 2000) and **transhumanism**, in which humans achieve “the singularity”—the merging of “biological existence to technology” (Kurzweil 2005, 9). What ecomodernism and other reformist philosophies avoid is addressing the fundamental exploitation of the capitalist system and a lack of scrutiny of linear visions of development centered on the **assumed universal benefits of technological solutions and economic growth** (Sachs 1992; Escobar 2011). In other words, the future of the Anthropocene as currently conceived is one in which Anthropos is treated as synonymous with Homo sapiens but in practice is a world that largely upholds the system of capitalist hetero-patriarchal modernity.

If we continue to see the world as divided in half, between nature and culture, then it is only logical that we will see violence against humans and non-humans as separate problems. If we begin to see the world as one, then we might find that these problems are in fact one and the same.

Why Heidegger makes sense in cont. phil. of technology (Botin)

- Heidegger points at the existential dialectical essence in technology, which means that both damnation and redemption can be mediated by technology.
- Big Data, information technology, AI, machine learning are giga phenomena that enframe the whole world, and in many ways set the global human population as a standing reserve for exploitation—just to frame things in classical terms of Heidegger's critique of modern technology.
- Heidegger points at the fact that we have never been and will never be able to control and master technology, and the technicity of technology. Technology fashions our being in the world, which I think is exactly the same view as **postphenomenology**.
- This is the essence of technology that fashions and moulds our being and becoming in a world that is also technified by the essence of technicity.
- Heidegger says: "...I do not see in them [half-way measures of democracy] any actual confrontation with the world of technicity, inasmuch as behind them all, according to my view, stands the conception that technicity in its essence is something that man holds within his own hands. In my opinion, this is not possible.
- These smart technologies often work on their own, paying attention and making decisions that should make human life less troublesome and safer, but also posing us as measurable and observable entities that can be pro-posed (nudged) or/and op-posed
- We are not able to get the full picture and give absolute answers to this being, but we are required to create some pictures and give partial answers. In the dying lines of the interview Heidegger says: **"For us today, the greatness of what is to be thought is [all] too great. Perhaps the best we can do is strive to break a passage through it—along narrow paths that do not stretch too far"**

What can history teach us about the prospects of a European Research Area?

received view = "science speaking truth to power", science as objective, value-neutral, universal

- actually based on hidden assumptions which arose historically

Scientific revolution (Descartes, Galileo) vs. the values of renaissance:

- SR searched for absolute certainty in the age of chaos and destruction
    - "The Book of Nature is written in the Language of Mathematics."
- renaissance thinkers believed in open discussion, celebrated differences in opinion, diversity, tolerance

Renaissance:
An important aspect was the recognition of the human condition as finite and knowledge as uncertain, and the important problem they tried to cope with, was: Granted that we are finite beings, and our knowledge is limited and uncertain, how do we act to make the best out of the present situation? Basic values were tolerance, humbleness, and the recognition of different perspectives.

Whereas Montaigne would highlight ambiguity and uncertainty as basic to human experience, and argue in favour of "sweet reasonableness" and tolerance, these measures were not adequate to the situation in which Descartes found himself.

The scientific revolution is not a product of the Renaissance, in particular not of Renaissance Humanism, but is rather a Counter- Renaissance.

"The humanities, which developed expertise in interpretation, multiple perspectives and dissent, promoted the value of reason, diversity and tolerance. The (natural) sciences, which developed expertise in the **reduction of uncertainty**, promoted the value of **rationality, uniformity and control**."

Poverty and starvation were massive, inspiring in the early political economists the notion of survival as competition for scarce resources.

birth of modern economics => issues of ownership, transaction, fairness, etc., could be solved with certainty and precision

Bios (innovation, endless growth, evolution, DNA) **vs. Geos** (limits, Gaia, interdependence)

- two conflicting grand narratives of the present
- Put briefly: listening to dominant voices in science today, one (Geos) tells us to Stop!; another (Bios) urges us to speed up.

Proposal of a deep innovation:

1. develop actual solutions to our problems, not new products and services masked as solutions
2. find new ways to link existing problems as interconnected
3. deep involvement of members of society in tackling problems, build new forms of agency
    - In the process, wider groups of stakeholders should be consulted, thus bringing "societal engagement" into the research and agenda setting process.

Return to reason.

- The central piece of heritage from the European Renaissance is the humanist ideal of reasoned dialogue between reasonable persons who are aware of their own limitations and are curious to learn from others. This is to be contrasted with later beliefs in the certainty of rational calculations on the basis of scientific knowledge, and the irrationality of what is not science.
- return to reason would imply that elites admit the limitations of their knowledge and therefore the need for the citizenry to accept responsibility and commit to actively contributing to the future of society; and a celebration of diversity would imply a strengthening of other voices than those of industry, then democracy means that everybody is entitled to have their voice heard and universalism means that it is reasonable to listen to them.

Evidence-based policies, or policy-based evidence?

- defy requests for hyper-precise information or advice and contribute to the criticism and discreditation of unfounded claims to certitude and rationality. In a return to reason, experts and policymakers would frequently have to admit that they lack precise knowledge of matters at hand and that there is no way of knowing if the proposed course of action will be successful.
- there is the work of **criticism and deconstruction of indicators that are presented as value-neutral or otherwise unproblematic** and in that way unduly contribute to hegemonies of power

Modern science and mathematics were not only instruments of knowledge, they were also instruments of power. Nature was not only to be studied but to be controlled in order to fulfil our human destiny as Masters.

- not only nature, but also politics, people, economy…
- The new world could only be constructed by way of a radical abstention from religious dogma, politics and popular opinion, and the most powerful source for doing so was the new mathematical (and experimental) sciences.
- political stability and order in the early 18th century was predicated on the simultaneous emergence of a Newtonian universe guided by stable and universal laws. Natural philosophy and science came along with, was co-produced with, the articulation and emergence of political and legal order.

Outwardly, Descartes projected the Cosmos, not as hierarchically ordered and with intrinsic meaning, but as inert and mechanistic. Nature was seen as an interlocking chain of cause and effect, an endlessly

working machine without intrinsic goals and purposes… the view of the planetary system as stable and law-abiding; the view that Nature's book is written in the language of mathematics, and so on. This **work to "purify space"** had started out with Galileo who, among other things, constructed straight ramps to measure the acceleration of a bullet. But neither the bullet nor the straight-lined ramp existed anywhere in Nature; they were constructs based on mathematical idealizations. The same went for Newton's laws.

Standardization and measurements:
One can choose to improve the fit by changing the world so that it better fits the measurements. If what Husserl called "lifeworld" is not a linear, static geometrical space, one may change the world physically, economically and socially to comply with the metrics. This is done in architecture and engineering, with the introduction of standardised materials and structures (straight lines and planes; straight angles; surfaces low in friction, etc.) but also in agriculture (e.g. monocultures) and by social and political regulation to standardise behaviour and expression of human life. **Husserl** called this strategy **"the colonization of the lifeworld",** and it shows the aggressive character of modern science and technology.

We as such humans become a different type of decision-maker: more of a "rational actor" who decides on the basis of estimated cost-benefit ratios and less of a "reasonable person" who decides on the basis of a larger set of reasons and in deliberation with other persons with other types of reasons.

Knowledge/power:
Bacon: "Knowledge is always better than ignorance because it provides us with more power, that is, more possibilities to avoid harm and achieve good." But Bacon does not – and probably could not – anticipate the more profound understanding of how Knowledge is Power that is often associated with the French philosopher Michel Foucault (1926-1984): **Knowledge gives power over somebody else.**

> + In actual cases, there is always only partial knowledge, that is knowledge of some causal relationships. When such knowledge is applied, there is the possibility of **unforeseen and undesirable higher-order effects**

*It remains an empirical question whether a particular piece of knowledge or technology in fact has created more benefit than harm. This possibility – that the **benefit-cost ratio of new knowledge and technology may be smaller than 1** – is largely ignored in current regulation and governance of science and technology.*

A system may appear less dysfunctional and more competent after one has understood that its function is different from the purported purpose. For instance, certain contemporary financial institutions and policies may appear quite functional from the perspective that their main function is to enrich a certain set of privileged actors rather than increase wealth and distribute it fairly. This insight may call for a different strategy for change than if the problem simply were incoherence or incompetence.

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the problem of a scientific approach to policymaking:
it is assumed that the government can perform **"governance of complexity**" rather than being condemned to performing "**governance in complexity**". As a consequence, governmental policies risk becoming counter-productive by trying to enforce desired system states and thereby inadvertently harming desirable dynamics

- knowledge that is produced to prescribe policy action is a massive simplification of the reality. The regularity of phenomena such as economic or scientific development is much more doubtful than that of falling physical objects. Hence, all such studies have deep methodological problems,

including that of distinguishing causality from correlation and of determining directions of the causality

the Modern Framework

- was a response to an urgent problem, that of establishing order in the face of unrest and war. The fact that it did actually manage to contribute to the establishment of order and stability did not once and for all remove the underlying problem but rather displaced it. The economy became "war with other means"
- violence was not done away with once and for all, but rather contained within a set of new ideas and institutions. These were, to some extent, **capable of transforming aggressive tendencies, but not to eradicate them.**

Importance of balanced/separated spheres of power within the modern framework

- the decisive accomplishment of the modern framework was that of establishing an ecology of ideas and practices that were mutually balanced against each other. This balance of forces must be seen as highly delicate and in need of constant renewal and care
- The **main function of this balance was not to achieve efficiency and progress (**for this, authoritarianism may have more on offer); it came out of the realisation that power may also corrupt, and must be kept in check
- The 20th century has seen a steadfast tendency towards integrating science and technology into the very heart of other activities and spheres, centrally those of industry and the economy. This **collapse of spheres should be regarded with some scepticism and even alarm**

The direct involvement of science into the industrialized regime of innovation is damaging science and its potential uses for the benefit of society. **"Key enabling technologies", from ICTs through biotechnology to robotics are not even close to providing solutions to the societal grand challenges** of our time; in many cases they are even working in direct opposition to sustainability and change.

Bios as an evolution from the industrial era:

- a new "programme" emerged to replace the traditional industrial base with more knowledge-intensive industries and services. These developments were mainly initiated in the US but rapidly spread to Europe. Information technologies and biotechnologies were at the heart of this enterprise; later other fields such as nanotechnology, cognitive science and the renewables industries have joined them.
- at the heart of it all, there emerged a new character, the researcher-maverick, the **scientific entrepreneur.**
- Common to these visions is the perception that technological innovation is proceeding on an ever-fastening speed, and **that Europeans better get on board the bandwagon of innovation and competition before it is too late.**

the **Anthropocene is more than a geological epoch**, and much more than climate change research: it makes up a whole new framework for scientific research, and for conceiving of Man's place on Earth and in the Universe.

The Geos disciplines are based upon the construction of a storyline of one finite and vulnerable Earth:

- **BUT** the message of Geos- was always conceived from within the institutional framework of Bios-. We see this, for instance, when green technologies are introduced as main drivers of economic growth.

How did Geos come to be?

- Carson's ***Silent spring***: placing post-war science within a culture of arrogance and based upon dominance over nature –> arguments in the book also eventually leading to the ban of DDT, establishment of the Earth Day (March 20)

- also, the **Moon expeditions** – The expedition produced images of Earth which, when seen from space, looked lonely and vulnerable. Said the "last man on the moon", Eugene Carnan: "We went to explore the Moon, and in fact discovered the Earth". The image reflected back on the spectators and observers, and showed them all to be members of one global and interdependent community

Western societies have so far not heeded the message of the ecological movement, one reason being that it simply does not fit within its institutions or frames of thinking. ***One may ecologise and one may modernise, said Latour (1998), but one may not do both at the same time.*** *So far, however, that is what the West has tried to do.*

It seems imperative that societies and economies that profess to take science seriously should make the transition into modes of living and producing that are more in accordance with the limits of Earth. There are numerous reasons why that cannot be done, however, most of which have to do with the fact that most economic, political and scientific institutions were not designed with that purpose in mind. **European societies (and the West more generally) are trying to adapt to a new situation mainly by using the formulas of a previous age. Our thinking and our basic institutions are not adapted to the realities in which we find ourselves.** If it makes sense to talk about a transition from one framework (Bios-) to another (Geos-), this would result from a gradual debunking of the Bios- paradigm

The idea that scientific knowledge should determine or prescribe the course of action is in itself part of the 17th century solutions that contemporary society has inherited as part of the problem. Facts and values, and knowledge and action, come entangled into each other, but the one should not be taken to prescribe the other.

The central piece of heritage from the European Renaissance is the humanist ideal of reasoned dialogue between reasonable persons who are aware of their own limitations and are curious to learn from others. This is to be contrasted with later beliefs in the certainty of rational calculations on the basis of scientific knowledge, and the irrationality of what is not science.

The inadequacy of quantitative indicators:
Scientists, analysts and other experts are still asked to improve their indicators and statistics to reduce uncertainty and provide a firm basis for evidence-based policies. From history and philosophy one can learn that for many complex issues there is no certitude to be had without falling into the strategic production of policy-based evidence rather than evidence-based policy.

Defy requests for hyper-precise information.

Urry: The system of automobility

Automobility as a coercive system. *Much 'social life' could not be undertaken without the flexibilities of the car and its 24- hour availability.*

A coercive system: Automobility divides workplaces from homes, producing lengthy commutes into and across the city. *It coerces people into immense flexibility.*

The objective clock-time of the modernist railway timetable is replaced by personalized, subjective temporalities, as people live their lives in and through their car(s) (if they have one).

To inhabit the roads of the west is to enter of world of anonymized machines, ghostly presences moving too fast to know directly or especially to see through the eye. *There is no reciprocity of the eye and no*

look is returned from the 'ghost in the machine'. Communities of people become anonymized flows of faceless ghostly machines.

Large areas of the globe consist of car-only environments – the non-places of super-modernity (Augé, 1995; Merriman, 2004). About one-quarter of the land in London and nearly one-half of that in LA is devoted to car-only environments.

The driver-car actor/cyborg:
The driver's body is itself fragmented and disciplined to the machine, with eyes, ears, hands and feet, all trained to respond instantaneously and consistently. The car becomes an extension of the driver's body, creating new subjectivities organized around the extraordinarily disciplined 'driving body'. The car can be thought of as an extension of the senses so that the car-driver can feel its very contours, shape and relationship to that beyond its metallic skin. Within the private cocoon of glass and metal intense emotions are released in forms otherwise unacceptable (see Michael, 1988, on road rage).
The automobility system as a typical example of **path dependency.**

- the article ends up recommending techno-optimist solutions such as nanotechnology and "shared" *(=owned by monopolistic actors and rented out, if we look at how this system works today)* cars; not a very thought provoking end to the very interesting intro of the article

The political ontology of automobility (Braun, Randell)

Automobility is rather one manifestation or instance of the political ontology that is the lifeworld we all inhabit: the Anthropocene. It is a name which, Bruno Latour has argued, "may become the most pertinent philosophical, religious, anthropological, and . . . political concept for beginning to turn away for good from the notions of Modern and modernity"

The article critically examines the assumptions underlying the prioritization of automobility in modern societies and shows automobility as one of the dominant apparatuses of our world.

Automobility as a late-modern social and political order made spatially visible

- order, as in, it structures everything around us
- all of the current world is enabled and enacted by automobility
- automobility is everywhere, it is not separated from other parts of our lifeworlds (and so are other apparatuses (academia, industry, …), everything is entangled together, they are not confined spaces; there are multiple spaces entangled together within one single space)
- In automobility, violence is considered normal. It is a routine, constant, violent attrition of human and non-human life
- since the conception of automobility, it has directly killed more people than all the wars combined in this same time (approx. 80 million people)

Barad – Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter

aim is to contribute to efforts to sharpen the theoretical tool of **performativity**

—a materialist, naturalist, and **posthumanist elaboration**—that allows matter its due as an active participant in the world's becoming

It is vitally important that we understand how **matter matters.**

representationalism is the belief in the ontological distinction between representations and that which they purport to represent; That is, there are assumed to be two distinct and independent kinds of entities—representations and entities to be represented. *This taken-for-granted ontological gap generates questions of the accuracy of representations. For ex- ample, does scientific knowledge accurately represent an independently existing reality? Does language accurately represent its referent?*

Butler sums up the **problematics of political representationalism** as follows:
Foucault points out that juridical systems of power produce the subjects they subsequently come to represent. Juridical notions of power appear to regulate political life in purely negative terms. . . . But the subjects regulated by such structures are, by virtue of being subjected to them, formed, defined, and reproduced in accordance with the requirements of those structures.

Representationalism is so deeply entrenched within Western culture that it has taken on a commonsense appeal.

it is possible to develop coherent philosophical positions that deny that there are representations on the one hand and ontologically separate entities awaiting representation on the other. A performative understanding, which **shifts the focus from linguistic representations to discursive practices**, is one such alternative.

I propose a specifically **posthumanist notion of performativity**—one that incorporates important material and discursive, social and scientific, human and nonhuman, and natural and cultural factors.

Representationalism separates the world into the ontologically disjoint domains of words and things. The knowing subject is enmeshed in a thick web of representations such that the mind cannot see its way to objects that are now forever out of reach and all that is visible is the sticky problem of humanity's own captivity within language, then it begins to become apparent that **representationalism is a prisoner of the problematic metaphysics it postulates.**

Quantum:
For Bohr, things do not have inherently determinate boundaries or properties, and words do not have inherently determinate meanings. Bohr also calls into question the related Cartesian belief in the inherent distinction between subject and object, and knower and known.

- Bohr rejects the presupposition that language and measurement perform mediating functions. **Language does not represent states of affairs, and measurements do not represent measurement-independent states of being.**

Agential realism:
Agential intra-actions are specific causal material enactments that may or may not involve "hu- mans." Indeed, it is through such practices that the differential boundaries between "humans" and "nonhumans," "culture" and "nature," the "social" and the "scientific" are constituted. Phenomena are constitutive of reality. Reality is not composed of things-in-themselves or things-behind-phenomena but "things"-in-phenomena. **The world is intra- activity in its differential mattering.**

The world is a dynamic process of intra-activity in the ongoing reconfiguring of locally deter- minate causal structures with determinate boundaries, properties, mean- ings, and patterns of marks on bodies. The world is an ongoing open process of mattering through which "mattering" itself acquires meaning and form in the realization of different agential possibilities.

Agency is not an attribute but the ongoing reconfigurings of the world.

Foucault:
According to Foucault, **discursive practices** are the local sociohistorical material conditions that enable and constrain disciplinary knowledge practices such as speaking, writing, thinking, calculating,

measuring, filtering, and concentrating. **Discursive practices produce, rather than merely de-scribe**, the "subjects" and "objects" of knowledge practices.

agential realism's posthumanist account of discursive practices

- does not fix the boundary between "human" and "nonhuman" before the analysis ever gets off the ground but rather enables (indeed demands) a genea- logical analysis of the discursive emergence of the "human." "Human bodies" and "human subjects" do not preexist as such; nor are they mere end products. "Humans" are neither pure cause nor pure effect but part of the world in its open-ended becoming.

Matter is not immutable or passive. It does not require the mark of an external force like culture or history to complete it. Matter is always already an ongoing historicity.

intra-actions are constraining but not determining. That is, intra-activity is neither a matter of strict determinism nor unconstrained freedom. **The future is radically open at every turn.**
the notion of intra-actions reformulates the traditional notion of causality and opens up a space, indeed a relatively **large space, for material-discursive forms of agency**.

Agency is about the possibilities and account-ability entailed in reconfiguring material-discursive apparatuses.

Garfinkel, Lynch, Livingston – The Work of a Discovering Science Construed with Materials from the Optically Discovered Pulsar

Cocke and Disney's discovery is this: **From the local historicity of the embodied night's work they extract a cultural object, the independent Galilean pulsar**. The IGP retains the material contents of astronomical things in their entirety. Nevertheless, the IGP, the potter's object, is a **cultural object, not a 'physical' or a 'natural' object.**

Lynch – Ontography as the Study of Locally Organized Ontologies

- there is not a single ontology, there are many locally organized ontologies (*many worlds*)
- study of these locally organized ontologies = ontography
- focused local contexts – ontologies are not universal or fixed, but contingent upon specific practices, interactions, and settings
- study of ontographies involves close observation and documentation of the practices, tools, and interactions that constitute the ontological arrangements in a given locale = **related to ethnomethodology**
- reveals the multiplicity of realities, showing that different groups organize and understand the world in diverse ways

Amanda Kearney – Violence in Place: Reading Violence through Kincentric Ecology

- concern for the impact of violent human acts, which precipitate the physical destruction of place, erasure of place distinctiveness, and which instate toxicity along with ecological decline in places of cultural importance.
- a strong sense that place has suffered at the hands of human agents.

- **Kincentricity** is a view of "humans and nature as part of an extended ecological family that shares ancestry and origins"
- Engaging place on such terms mitigates a view of place as simply a "backdrop" to human life
    - Place is conceived of here as a spatial, physical, and ecological point, but also that which is existentially available to us through the mind's eye, meaning it may also be intangible, as is the case for ancestral realms and memoryscapes.
- **there is no narrative structure to a toxifying event or slow poisoning**. Toxic disasters "... violate all the rules of plot" generating epistemological confusion and ontological uncertainty.
- people grapple with having to choose "between environmental degradation and monetary compensation".

Human responsibility as the new Human rights:
Accenting human responsibility over human rights is not to deemphasize the experience of disproportionate human suffering, nor dispute claims to cultural wounding and associated trauma. Instead, it is to locate the effects of such wounding and its lasting effects within a wider context of relations, and in doing so, highlight the relationship between human suffering and other localized suffering.

- we are compelled, through responsibility, to consider how rapid change and uncertainty, as it might compromise integrity and survival, impact upon the place world.

Jurkevics – Land Grabbing and the Perplexities of Territorial Sovereignty

Land markets in the global south have been expanding at such a rapid pace that a new designation has emerged: "**land grabbing**," which refers to the large-scale (>10,000 hectares) private acquisi- tion of land rights. In 2010, the World Bank reported that land grabs covering approximately 56 million hectares of land had been announced or transacted in 2008–2009, compared to an average 4 million hectares in previous years.2 As a point of reference, 56 million hectares of land is larger than France.

- democratic rule over the grabbed land impossible by **violating occupancy rights, diminishing public space, and monopolizing control over land.**
- 43% of the total area targeted by land grabs is inhabited. In a sample of 89 land grabs, 57 involved displacement of individuals and families from grabbed land

by selling large plots to foreign investors, the host state has diminished the people's resource sovereignty by alienating its governance of land.

- reestablishing lost territorial sovereignty via the PSNR claim will not help affected groups strengthen democratic control over land, and may actually do the opposite
    - later in the text, Jurkevics is **arguing for new forms of democratic control over land which include limiting the power of the state over land** (as this model is prone to privatizations and land-grabbing)
    - the exclusive prerogatives of state sovereignty enable land grabbing, and that invoking sovereignty to resist the phenomenon is therefore contradictory
    - the reinstatement of territorial sovereignty is highly unlikely to bolster democratic participation in communities, often indigenous minorities, that are most vulnerable
    - If we believe that democratic participation in rule is important, then **we should be worried about large-scale public-to-private land transfers.**
    - Moreover, once land is surveyed, made legible, and **controlled by a sovereign state, it can more easily be commodified and packaged for sale in global land markets**. Thus, the historical development of sovereignty, which required the rationalization of land management, helped to set the stage for territorial alienation via land grabbing.

The practices of **world-building**, I argue, are a key component of autonomy and self-determination and **must be included in any robust theory of participatory democracy**. Importantly, land grabs do not only occur in corrupt and kleptocratic regimes; they are also practiced in what we consider strong democracies, and in these cases, they still severely undermine the democratic capacities of affected groups. An analysis of land grabbing thus illuminates why **democrats should not only be interested in elections and discursive participation in the public sphere but participation in the material practices of land management as well.**

- Beyond contract negotiations, inhabitants should also be granted participation in activities like zoning, building infrastructure, regulating common land and usage rights, and managing the environment.
- There are many parallels between the ideas of world-building, occupancy rights, and self-determination, but, as I discuss below, only the world-building concept is constructed on **explicitly anti-sovereigntist grounds**.

In Stilz's language, **our autonomy depends on our ability to create and revise our located life plans**, to have a say in the shape and fate of the place we live our lives. For most people around the world, our experience of freedom is inextricably tied to the place we call home. To be free, therefore, inhabitants must have access to political decisions over their home instead of having those decisions imposed by an alien power. Below, I theorize the activities that determine the shape of our shared homes as practices of world-building.

Those invested in democratic rule over land should be suspicious of sovereignty, in all its guises.
Property claims require contractual negotiations but not a political founding. Thus, **private land ownership can offer a subtler route to power than outright conquest**, because the purchaser makes no (initial) claim to rule. Historically, property rights have been established through purchase, occupation, or the mere presumption of land improvement.

Many land-grabbing contracts transfer jurisdictional powers via **"stabilization clauses,"** which are included to reassure investors that future changes in the political landscape will not undermine their investment. Stabilization clauses require the host state to compensate the investor for future legislation that negatively affects the investment, such as environmental regulation. In many of the countries targeted for land grabs, governments cannot afford the compensation that would result from new regulations, and so political action that runs counter to investor interest is paralyzed.

scrip currency. Before being outlawed by the Fair Labor Standards Act (1938), it was common practice to concentrate workers on company-owned land and pay them with scrip currency, which could only be used at company stores and for rent in company-owned housing.

Researchers in Indonesia find broad popular support for palm oil production, with the exception of indigenous groups. **If we use a standard of majority support, then territorial alienation for the sake of palm oil production may lead to injustice for indigenous groups but is democratically legitimate**. It is exactly this idea—that consent via national elections or majority support makes land grabbing democratically legitimate—that I would like to challenge. The problem with this line of reasoning, which equates democratic legitimacy with majoritarianism, is that **it cannot account for the geographical dimensions of participating in rule, which is the aim of democracy in a simpler sense.**

To summarize, the fundamental problem with territory-alienating land grabs is not that they alienate the state's sovereignty but that they obstruct democratic participation in land governance by blocking access to world- building, violating occupancy rights, diminishing public space, and monopolizing control over land. Therefore, even where it is supported by a national majority, land grabbing poses a threat to democracy.
One thing is certain: inhabitants of land with a moral right to occupancy must have access to participation in these decisions if we are to live up to notions of democratic legitimacy.

Who is "the people" who should decide over land?

- It is exactly because of this ambiguity over peoplehood that we need a geographically dispersed understanding of participatory democracy, one that emphasizes the importance of minority, indigenous, and rural access to the activities of world-building.

substate groups, including indigenous peoples, deserve self-determination rights and increased (though not absolute) control of their ancestral territories. The answer is to proliferate popular resource sovereignty.

- I would therefore argue that the dispersal of self-determination rights away from the nation-state is in line with the suggestion I am making in this essay, which is to **fracture the sovereignty of nation-states.**
- founded on Arendt's exhortation to theorists to consider institutional configurations that **"banish the sovereign."**
- we do not need the framework of sovereignty to bound groups of occupants by territorial jurisdiction (i.e., to bound the demos). **Jurisdictions need not be sovereign; they can be overlapping**

Territorial sovereignty provides a boundary for the demos but at such a scale that the demos becomes an imagined, exclusionary macrosubject, often in the guise of "the nation." Shared occupancy and the shared practices of world-building, on the other hand, can be conceptualized on many scales without a macrosubject. The idea of shared occupancy is nonexclusionary; it simply conveys the fact that we live together.

Carlo Rovelli – The Disappearance of Space and Time

I argue that lesson of general relativity is that at our present state of knowledge the best way for making sense of the world is to **discard the notions of space and time**. Newtonian space and time can be reinterpreted as aspects of the gravitational field, which is only one among the various dynamical physical fields making up the world. Physical fields do not need to inhabit spacetime in order to exist.

Newton made the successful hypothesis that space and time are fixed structured background entities underlying material reality, which participate in governing the motion of physical objects. What Einstein has discovered is that **Newton had mistaken a physical field for a background entity**. The two entities hypostatized by Newton, space and time, are just a particular local configuration of a physical entity — the gravitational field — very similar to the electric and the magnetic field. Einstein's discovery is that Newtonian space and time and the gravitational field are the same entity.

- **There are no space and time: there are only dynamical objects**. The world is made by dynamical fields. These do not live in, or on, spacetime: they form and exhaust reality. One of these fields is the gravitational field.
- Relativistic spacetime is an entity far more akin to Maxwell's electric and magnetic fields than to Newtonian space.
- Give up the notions of "space and time entities" entirely. This is not a dramatically radical view, since it is not far from the way space was commonly conceptualized before Newton.

In Newtonian physics, if we take away the dynamical entities, what remains is space and time. In relativistic physics, if we take away the dynamical entities, nothing remains.

Space as an independent entity X space as a relation

The immense empirical triumph of Newtonianism could not be overcome. For three centuries.
After three centuries, Einstein found a new and simpler answer. The bending of the surface of the water is due to the relative motion of the water with respect to a physical entity: the local gravitational field. It is the gravitational field, not Newton's inert absolute space that tells objects if they are accelerating or not, if they are rotating or not. There is no inert background entity such as Newtonian space: there are only dynamical physical entities.

The disappearance of physical time is the second characteristic feature of the relativistic revolution.

Special relativity is the discovery that it makes no physical sense to say that two distant physical events happen "at the same time". There are physical events on, say, Andromeda that have no temporal relation with events on Earth. A small gravitational wave passing in between could change Einstein's simultaneity between us and them by years, without affecting the physics here or there.

- The lesson is that the idea that there exists a "now" all over the universe does not square with what we know about the universe. The picture of a Universe changing from one global instant to the next is incompatible with what we know about the world.

Special relativity –> general relativity:

- What is then "time" in the light of GR? This is a deep and important question that in my opinion has not yet been sufficiently investigated. I offer here what I think is the most useful answer to this question.
- GR teaches us that we must **abandon the idea that the flow of time is an ultimate aspect of reality.** The best description we can give of the world is not in terms of time evolution.
- **Clock times are simply the readings of certain physical variables**, which can be locally employed as the independent variable for convenience. Once again, **they have nothing to tell us about the ontology of time.**
- The only residual time notion that keeps a resemblance of temporality is **proper time**. Proper time does not flow uniformly in the universe. It is defined along a world line and, generically, if two world lines meet twice, the two proper times lapsed between the two encounters differ. Proper time S depends on the gravitational field, which is influenced by the interaction with many systems.

S like the distance d described in the previous section, is just an observable feature of the gravitational field, which is particularly convenient to use as a stable reference in our environment, when describing the motion of objects assuming the gravitational field fixed.

If we take **quantum theory** into account, the spacetime continuum, with its last vague resemblance to temporality disappears completely, **we confront the absence of time at the fundamental level in full**.

So, **where does temporality**, with all its peculiar features ("flow" of time, whatever this means, irreversibility, memory, awareness y) **come from**? I think that all this has nothing to do with mechanics. **It has to do with statistical mechanics, thermodynamics, perhaps psychology or biology (!!!)**

- temporality might be an artifact of our largely incomplete knowledge of the state of the world, not an ultimate property of reality.

Some people find the absence of time difficult to accept. I think that this is just a sort of nostalgia for the old Newtonian notion of an absolute "Time" along which everything flows, a notion already shown by SR to be inappropriate for understanding the real world. I think that the motivation for holding on to Poincare´ invariance, to unitary time evolution, to the idea that there is a "Present" extending all over the universe, is only to provide an anchorage for our familiar notions, which are appropriate to describe the garden of our daily life. But a bit more at large, ***these are notions that are inappropriate to describe this beautiful and surprising world we inhabit.***