

Reader Alchorisma  
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<http://alchorisma.constantvzw.org/reader>

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## GENERAL



Haraway proposes a way of thinking and acting beyond individualism with the word 'sympoiesis', which means 'making-with' or 'collectively-producing systems that do not have self-defined spatial or temporal boundaries' (2016, 35-6; 58). It describes a commitment to collaboration of all different beings on earth, as we are amidst urgencies that are not just human urgencies (ibid.). As opposed to autopoiesis, which means that systems, organisms, persons, things can be self-constitutive and self-making, sympoiesis implies that 'earthlings are never alone' (Haraway 2016, 58, emphasis hers). This making-with is always done together with all kinds of beings who can be called companion species.

— **Mauro Ricchiuti**

## NOTE TO READERS



For those of you who are reading this book and find it confusing that so many names are capitalized, I would like to give a further explanation. In the Seneca language and in most Native American languages in the original form, certain words are holy or sacred to Native American People. These words are always capitalized in our written languages.

Until recently, few Indian writers were published, and those who were did not have a say as to how the manuscript was dealt with. Harper Collins has shown respect for my work by printing it in our preferred form. For this kind of consideration, I am deeply grateful.

In Native American culture, we see everything as being alive. Each living thing has a specific role as a teacher and family member. Everything on Earth, whether stone, tree, creature, cloud, sun, moon, or human being, is one of our relatives. We capitalize the names of each part of our Planetary Family because they represent the sacred living extensions of the Great Mystery who were placed here to help humankind evolve spiritually. We capitalize Traditions and Teachings because these words represent the equivalent of another faith's holy books.

In Tribal Traditions, we do not consider Grandfather Sun a deity. We do not worship trees or rocks. We do, however, see the Eternal Flame of Love that the Great Mystery placed in all Creation and we honor that spiritual essence. In the Seneca language, we call it *Orenda*. This is the spiritual essence or creative principle called the Eternal Flame of Love that is found inside of all life forms. There is only one Original Source and we call that Creative Source the Great Mystery.

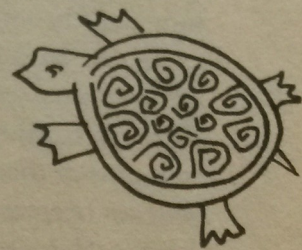
The Thunder Chief, *Hinoh* (Hēnō), is capitalized because of his role in bringing life-giving waters, without which we could not survive. Grandfather Sun and Grandmother Moon are capitalized because we see them as living beings. The Great Mystery gave them their missions of dividing day from night, bringing light and warmth to our world, as well as pulling the tides of our oceans. In all cases, the words that are

capitalized are given respect because of the sacred missions they carry and the extension of the Great Mystery's love that they represent. We teach that all life matters and we honor the Medicines of all life forms as sacred extensions of the Great Mystery's loving plan.

## INTRODUCTION



The first calendar that North American Indians ever had was Turtle's shell. Our Ancestors watched the passing of the cycles and seasons, noting that thirteen moons passed before the same seasons returned. Grandmother Nisa (Moon) was our guide. Through her changing cycles, she told women when their bodies were fertile and when they would experience their Moontimes, or menstrual flows.



Grandmother Moon disappeared and returned, showing her full face thirteen times during the year. The Earth Mother, who was represented by the most fertile creature on our planet, the Turtle, showed our Ancestors how to mark the passing of each moon cycle. Turtle's shell bore the thirteen moons of the year inside of a frame that formed the circle we call the Sacred Hoop, or Medicine Wheel.

This unifying circle represents the sacred relationship of all life to all life. The Sacred Hoop also represented the path across the sky or orbit that was our Earth Mother's yearly journey around Grandfather Sun. The orbit of Grandmother Moon's journey around our Earth Mother is another circle, giving the Ancestors an understanding of the import of all concentric circles bringing life into unity or harmony.

These thirteen moon cycles gave birth to the legends of the Thirteen Original Clan Mothers who represent the gifts and abilities humankind can develop during the Earthwalk, or physical life. These lessons of developing human potential contain the skills that every Two-legged human must learn in order to live in harmony with all life forms. When we learn what our potentials are and develop the skills of right relationship, we can offer to share those gifts with the whole of the Human Tribe. Generosity is the key to working for the benefit of all living things. If we give of ourselves and of our gifts, the blessings we have received are shared. We can then expand the boundaries and capabilities of all human potential.

When my editor approached me about writing this book, I began to see the value of putting together some lessons or thoughts for each day that could educate the reader about the ways of harmony that have imbued the best of Native American lifestyles. When these concepts are honored, the ideas of living in harmony within a community are easily attainable. Many non-Native friends have asked me to include some of the unspoken rules of etiquette that our Native American community observes in order to bridge potential cultural misunderstandings. I have done this in this text because it benefits our urban Native youths who have not been exposed to the Ancestors' ways as well as educating non-Natives. These lessons of respecting others and their Sacred Spaces can be applied to any culture, resulting in harmonious living.

I was recently surprised when one of my Mohawk sisters told me that she did not know that I had written the poems that begin every chapter in every book that I have authored or coauthored. The only exceptions carry the two names of the writers I quoted. I chose to write some of the thoughts for the day in this text with poetry because the rhythms and cadence of poetry often open our minds to different ways of understanding. Other thoughts for the day are written as Medicine Stories, and all are original. That is to say that these writings are based upon the lessons I have been taught on my path, but none of this text is taken verbatim from other sources.

Harper San Francisco wanted all original material for this book, so I decided to look at events in my life that had taught me about harmony, self-discovery, sharing, love, and more. I then asked for the Great Mystery's guidance. I called on the Clan Mothers' spirits to assist me in knowing which lessons would best represent their creed of Life, Unity, and Equality for Eternity. Then I used my gifts of storytelling and writing to express the beauty of the Ancestors' ways of harmony, creating new material that could reflect these lessons to others. I trust that these lessons, stories, and poems will assist all readers in continuing on their paths of personal healing. My personal desire, in writing this book, is that each one of you claim your right to *become your vision!*

— Jamie Sams, *Earth Medicine, Ancestor's Ways of Harmony for Many Moons*, Harper One, 1994, p. VII-X.





Diffract – dif-frange˘re – to break apart, in different directions (as in classical optics)  
Diffraction/intra-action – cutting together-apart (one move) in the (re)configuring of spacetimemattering; differencing/differing/diff rancng

Diffraction owes as much to a thick legacy of feminist theorizing about difference as it does to physics. As such, I want to begin by re-turning – not by returning as in reflecting on or going back to a past that was, but re-turning as in turning it over and over again – iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimematterings), new diffraction patterns. We might imagine re-turning as a multiplicity of processes, such as the kinds earthworms revel in while helping to make compost or otherwise being busy at work and at play: turning the soil over and over – ingesting and excreting it, tunnelling through it, burrowing, all means of aerating the soil, allowing oxygen in, opening it up and breathing new life into it. It might seem a bit odd to enlist an organic metaphor to talk about diffraction, an optical phenomenon that might seem lifeless. But diffraction is not only a lively affair, but one that troubles dichotomies, including some of the most sedimented and stabilized/stabilizing binaries, such as organic/inorganic and animate/inanimate. Indeed, the quantum understanding of diffraction troubles the very notion of dichotomy – cutting into two – as a singular act of absolute differentiation, fracturing this from that, now from then.

Re-turning as a mode of intra-acting with diffraction – diffracting diffraction – is particularly apt since the temporality of re-turning is integral to the phenomenon of diffraction. As I have explained elsewhere, intra-actions enact agential cuts, which do not produce absolute separations, but rather cut together-apart (one move).

Diffraction is not a set pattern, but rather an iterative (re)configuring of patterns of differentiating-entangling. As such, there is no moving beyond, no leaving the ‘old’ behind. There is no absolute boundary between here-now and there-then. There is nothing that is new; there is nothing that is not new. 6 Matter itself is diffracted, dispersed, threaded through with materializing and sedimented effects of iterative reconfigurings of spacetimemattering, traces of what might yet (have) happen(ed). Matter is a sedimented intra-acting, an open field. Sedimenting does not entail closure. (Mountain ranges in their liveliness attest to this fact.)

Diffraction is not a singular event that happens in space and time; rather, it is a dynamism that is integral to spacetimemattering. Diffractions are untimely. Time is out of joint; it is diffracted, broken apart in different directions, non-contemporaneous with

itself. Each moment is an infinite multiplicity. 'Now' is not an infinitesimal slice but an infinitely rich condensed node in a changing field diffracted across spacetime in its ongoing iterative repatterning.

Let's begin by re-turning (to) the past – to a key moment in feminist theorizing about diffraction. Rather than zooming in on one moment in time (as if there were such an infinitesimal temporal slice or instant of time that could be naturally picked out from a presumed whole line of sequential points) in order to see the infinity that lives through it, we re-turn to a thicker 'moment' of spacetime mattering – which we might designate by the spacetime coordinates Santa Cruz, CA late 1980s/early 1990s – when, thanks to the enormous labours and persistence of women of colour, questions of differences broke through the breakwater of Universal Sisterhood, built on the foundations of sameness and shared commonalities, to become vital to, if not the lifeblood of, feminist theorizing. This moment is dispersed/diffracted throughout the paper, and this moment, like all moments, is itself a diffracted condensation, a threading through of an infinity of moments-places-matterings, a superposition/entanglement, never closed, never finished.

[...] The self in positioning itself against the other, constituting the other as negativity, lack, foreignness, sets up an impenetrable barrier between self and other in an attempt to establish and maintain its hegemony. The self ('I') only ever sees itself, and not the other. The other, the 'non-I', is consigned to the shadow region, the space behind the mirror. According to this geometrical optics, the other is constituted as the Other. Difference as apartheid. As Trinh explains, this notion of difference premised on binary thinking has been instrumental to the workings of power, but it is not a necessary way of figuring difference.

Divide and conquer has for centuries been his creed, his formula of success. But a different terrain of consciousness has been explored for some time now, a terrain in which clear cut divisions and dualistic oppositions such as science vs. subjectivity, masculine vs. feminine, may serve as departure points for analytical purpose but are no longer satisfactory if not entirely untenable to the critical mind. What is needed, Trinh emphasizes, is a disruption of the binary, a way to figure difference differently. If this is to be the case then difference cannot be positioned in opposition to sameness, not in any absolute sense, for this would reiterate the same problematic logics. As Trinh puts it: a non-binary conception of difference is 'not opposed to sameness, nor synonymous with separateness'.

[...] Diffraction troubles the onto(epistemo)logy of classical physics. According to classical Newtonian physics, everything is one or the other: particle or wave, this or that, here or there. Quantum physics queers the binary type of difference at every layer of the onion (not merely on the micro-scale as opposed to the macro-scale, as if there were a line in the sand between micro and macro rather than an ongoing reconfiguring of spacetimemattering across and within spaces and times).

[...] This double movement, this play of in/determinacy, unsettles the self/other binary and the notion of the self as unity. The self is itself a multiplicity, a superposition of beings, becomings, here and there's, now and then's. Superpositions, not oppositions.

— Karen Barad. *Diffraction: Cutting Together-Apart*, 2014,

[https://www.academia.edu/30091118/Diffracting\\_Diffraction\\_Cutting\\_Together-Apart](https://www.academia.edu/30091118/Diffracting_Diffraction_Cutting_Together-Apart)



假作真时真亦假,无为有处有还无。

(Truth becomes fiction when the fiction's true; Real becomes not-real when the unreal's real.)

— Cao Xueqin

○

When our animal senses are all awake, our skin rippling with sensations as we palpate the surroundings with ears and eyes and flaring nostrils, it sometimes happens that our body becomes part of the larger Body of the land—that our sensate flesh is taken up within the wider Flesh of the breathing Earth—and so we begin to glimpse events unfolding at other locations within the broad Body of the land.

The smartphone replicates something of this old, ancestral experience of earthly acumen that has long been central to our species: the sense of being situated over Here, while knowing what's going on over There.

Perhaps it is easier to understand, now, why we're so enthralled by our digital technologies, such that once we're online and synapsed to the screen, it's remarkably difficult to tear ourselves away. For all these technologies awaken something primordial in us, a biophilic proclivity layered deep in our genome, a penchant for animate interchange with bodies whose shapes are very different from our own. The renewal of that age-old animistic sense of a world all alive, awake, and aware brings an upwelling of wonder, or at least an anticipation of a wondrous possibility waiting just around the corner.

— **David Abram, Magic and the Machine**

<https://emergencemagazine.org/story/magic-and-the-machine/>

○

So, image for a moment an object, a material, which can literally do anything. It can move across categorical boundaries with no difficulty whatsoever.

So what do I mean? I mean that if you possess the philosopher's stone and you were hungry, you could eat it. If you needed to go somewhere you could spread it out and sit on it and it would take you there. If you needed a piece of information, it would become the equivalent of a computer screen and it would tell you things. If you needed a companion, it would talk to you. If you needed to take a shower you could hold it over your head and water would pour out. Now, you see, this is an impossibility. That's right, it's a *coincidencia apositorum*. It is something that behaves like imagination and matter without ever doing damage to the ontological status of one or the other. This sounds like pure pathology in the context of modern thinking because we expect things to stay still and be what they are and undergo the growth and degradation that is inimical to them, but no, the redemption of spirit and matter

means the exteriorization of the human soul and the interiorization of the human body so that it is an image freely commanded in the imagination.

— **Terence McKenna, Lectures on Alchemy**

<http://www.mysterium.com/tmalchemy.html>



Charisma makes us hesitate, wavering in its force field. What if charisma were actual? What would the emission of such an energy field imply? It would imply, for a start, that art isn't just decorative candy. It would imply what “civilized” philosophy from Plato on has been afraid of, the fact that (shock horror) art has an effect on me over which I am not in control. Art is demonic: it emanates from some unseen (or even unseeable) beyond in the sense that I am not in charge of it and can't quite perceive it directly, in front of me, constantly present. A dangerous causative flickering: magic. Magic is taboo cause and effect, or unthinkable cause and effect: either ridiculous or dangerous or impossible, or some weird borrowed-kettle combination of all three. (...) Magic implies causality and illusion, and the intertwining of causality and illusion, otherwise known in Norse-derived languages as weirdness.

Appearance and essence are like two different “sides” of a Möbius strip, which are also the “same” side. A twisted loop is exactly what weird refers to, etymologically speaking. The minimal topology of a thing is the Möbius strip, a surface that veers all over, where a twist is everywhere. This is because the appearance of a thing is different from what it is—yet the appearance is inextricable from it. There is no obvious dotted line between what a thing is, a thing data. Attuning is like studying a Möbius strip.

What art gives us, argues Kant, is the feel of data, the data-ness of data, otherwise known as givennes (datum, Latin for what is given). This data-feel is, he argues, an attunement space, the one place in the whole universe where mesmerizing hesitation can happen—a very important mesmerising hesitation, because it underwrites the existence of a priori synthetic judgement, because in this experience, I get a magical taste of something beyond my graspable experience, a transcendental beyond-ness... Attunement is the feeling of an object's power over me—I am being dragged by its tractor beam into its orbit.

—**Tim Morton, Attune in Veer Ecology: A Companion for Environmental Thinking**

edited by Jeffrey Jerome Cohen, Lowell Duckert. 2017. University of Minnesota Press.



The necessity of changing methods is all the more obvious when it is a question of finding the explanation of a phenomenon that nature offers in all of its complication. There, where the givens are by their very existence more complicated than the results we seek, direct synthesis becomes inapplicable, and it is necessary to take recourse either to direct analysis if possible, or to indirect synthesis, to feeling around (tâtonnement) and explanatory hypotheses.

— **André-Marie Ampère**



The response to technology in this period thus confounded familiar oppositions: fetishism and scientific truth; magic and mechanisation' charisma and instrumental rationality. Walter Benjamin's discussion of "the aura" of a work of art offers insight to such doublings. In "The World of Art in the Age of Mechanical Reproduction" he spoke of the aura as a "nearness in a distance," explaining the concept with reference to a poem of Novalis that described a landscape that seemed to look back at a human spectator. For Benjamin, such an encounter was the paradigmatic experience of aura: "the transposition of a response common in human relationships to the relationship between inanimate or natural object and man. In other words, "To perceive the aura of an object we look at means to invest it with the ability to look at us in return."

— **John Tresch, Romantic Machine, The University of Chicago Press, 2012**



The acceptance of the principle of homophily, that 'similarity breeds connection' becomes a self-fulfilling prophecy whereby, when we bemoan the existence of echo chambers it is presumed that something can be done about it by 'listening' to those who do not share our beliefs, etc. However, this criticism usually voiced by liberals to complain about what they see as an increasingly sheltered and fearful 'coddled' force within the left that 'refuses' to engage with ideas they might find unpalatable, entirely ignores the fact that it is the constructs underlying network science - what Kyong Chun calls a particularly retrograde (effectively segregationist) form of identity politics - that creates the echo chambers. Moreover, these chambers or 'silos' are more profitable for entities such as Google (but also for those currently in political power) because they allow for the simple organization, and thus management, of society.

My reading of this, then, is that – following Kyong Chun – networked communications not only contain racial (and gendered, etc.) bias within them, but that they work like race; that technology is as race, rather than technology being racialised.

Kyong Chun’s hopeful solution to this is to recreate the network otherwise, to build models that ingrain a knowledge of history within them in order to expose the ways in which racial logics are constructed into the system. This would require computer scientists who are also race critical theorists!

This, however, may be overly optimistic if we take on board the critique mounted by computer scientist, Syed Mustafa Ali. In his view, a decolonial reading of the history of computing is necessary to decolonize computer studies because computing is itself a ‘colonial phenomenon’ (Ali 2016: 16). Computing has been shown to mirror colonialism in that it is expansionist, being ‘ubiquitous and pervasive’ (ibid. 18). However, for Ali, this is not mere analogy. Rather, the observation of the coloniality of computing needs to be set in

‘relation to a more general, expansionist thrust of computing associated with the transformation of the modern world through incessant computerization and the rise of a global information society following the “cybernetic turn” of the 1950s’ (ibid.).

— Alana Lentin, **The future is here – revealing algorithmic racism**

<http://www.alanalentin.net/2018/10/22/the-future-is-here-revealing-algorithmic-racism/>



## **1. Introduction**

Does computing need to be decolonised, and if so, how should such decolonisation be effected? What these and other related questions point to is the possibility that computing is – or at least *should be* considered as – a colonial phenomenon. ‘Critical’ positions such as feminism and disciplines such as science and technology studies (STS) afford insights into the social, economic, political, cultural and other factors impinging on computing as an entangled outgrowth of various developments within fields such as logic, mathematics, science and technology. Yet surely it is somewhat of a stretch to describe computing as ‘colonial’, especially since colonialism as a phenomenon tied up with imperial structures of domination and settlement is a thing

of the past? How *can* computing be colonial if the ‘age of empires’ is over and we live in a postcolonial world? In order to motivate engagement with the idea of computing as a colonial phenomenon, it is necessary to ‘excavate’ the history – or rather, *genealogy* – of modernity, and one way of proceeding in this regard is to consider the formation of the contemporary world system in terms of its socio-political ontology (that is, its nature or being). (...)

In its modern form, colonisation involved the spread of tens of millions of Europeans around the world, so much so that in many settled colonies, European settlers formed a large majority of the population. Such settlement involved both expropriation of land, labour, materials and knowledges, and the genocide of indigenous peoples and enslavement of others – specifically, Africans.

(...)

An important – arguably *categorical* – difference between European colonialism and ‘classical’ or pre-modern colonialism is that, according to Wallerstein, European colonialism brought forth a world system constituted by a European ‘core’ and non-European ‘periphery’

(...)

Colonialism as a project of European political domination involving settlement *formally* ended with the national liberation and independence movements of the 1960s. Yet the modernity which colonialism engendered persists, albeit transformed under the condition of postmodernity, which has meant the persistence of certain ‘sedimented’ colonial ways of knowing and being – that is, colonial epistemology and ontology – based on systems of categorisation, classification and taxonomisation and the ways that these are manifested in practices, artefacts and technologies.

### **3. Modern/Colonial Computing**

If the genealogy of the modern world system sketched above is broadly correct, then it follows that computing is necessarily colonial *insofar as it is modern*.

(...)

### **4. Postcolonialism and Postcolonial Computing**

One response to the colonial impulse of computing has been to argue for the articulation and adoption of a ‘postcolonial’ computing.

(...)

Postcolonial computing examines issues of culture and power at work in computing and ICT contexts including ICT4D, HCI and design methods (Irani et al. 2010) (Philip et al. 2012) and ubiquitous computing (Dourish and Mainwaring 2012). While recognising the constructive possibilities associated with such a project, there are a number of



shortcomings with this approach which arguably stem from its grounding in postcolonial theory: for example, Lomba (2005) maintains that, “the relevance of postcolonial studies to our world continues to be questioned, both on earlier grounds of being jargonistic, somewhat depoliticised, and encouraging a rarefied approach to culture and literature, and on newer grounds of being unable to account for the complexities of globalisation” (p.1). She also points out that “postcolonial theory has been accused of ... shift[ing] the focus from locations and institutions to individuals and their subjectivities” (p.20). In addition, and relatedly, there is a tendency within postcolonial theory to marginalise economic concerns. Perhaps most problematic, however, is that insofar as postcolonial theory grounds itself in the poststructuralist ideas of Foucault, Lacan, and Derrida, it leaves itself open to the charge of cooption into a project of critical transformation that remains *internal* to Europe; in short, postcolonial theory ultimately constitutes, at least epistemologically, a Eurocentric critique of Eurocentrism.

It is important to note that such theoretical shortcomings have been conceded, at least partially, by proponents of postcolonial computing.

## **5. The ‘Decolonial Turn’**

According to decolonial scholar Ramon Grosfoguel, the problem with postcolonial studies is that it conceptualises the capitalist world-system primarily in cultural, literary and historical terms, while the problem with world-system theory is that it frames it primarily in terms of economic relations. As a result, world-system theorists find it difficult to conceptualize culture while postcolonial theorists have difficulties conceptualizing political-economic processes. For this reason, Grosfoguel and other decolonial theorists advocate embracing ‘decolonial’ thinking instead of *postcolonial* thinking.

(...)

This shift in thinking (the ‘decolonial turn’) involves what Walter Dignolo and Madina Tlostanova (2006, 2009) refer to as ‘delinking’ and border-thinking. That is, consideration of the ‘body-politics’ and ‘geo-politics’ of knowledge – that is, *who* is thinking / knowing and from *where* – engaging thereby with the *material* dimensions of epistemology in contrast to the abstract / disembodied ‘theo-politics’ and, following secularization, ‘ego-politics’ of universalizing Eurocentric epistemology by thinking from the margins (borders, frontiers, periphery). Such ‘materiality’ is not that of the race-less / de-raced structures of political economy or culture, but that of the corporeal experiences of those who have been excluded from the production of knowledge by colonial modernity.

(...)

## **6. Decolonial Computing**

In contrast to the postcolonial computing approach described earlier, and inspired by the 'decolonial turn' referred to above, the idea of a 'decolonial computing' has recently been proposed as a response to computing's 'colonial impulse' (Ali 2014). Grounded in a synthesis of the 'oppositional' critical race philosophy of Charles W. Mills and the work of decolonial scholars such as Mignolo, Grosfoguel and Maldonado-Torres, decolonial computing attempts to engage with the phenomenon of computing from a perspective informed by (even if not situated at) the margins or periphery of the modern world system wherein issues of body-politics and geo-politics are analytically fore-grounded. Put differently, decolonial computing, as a 'critical' project, is about interrogating *who* is doing computing, *where* they are doing it, and, thereby, *what* computing means both epistemologically (i.e. in relation to knowing) and ontologically (i.e. in relation to being).

## **8. Conclusion and Future Work**

Computing is inherently colonial in some sense because, as a *modern* phenomenon, it is founded upon, and continues to embody aspects of, colonialism. This applies to specific kinds of computing such as ubicomp, which has been said to be driven by a 'colonial impulse', as well as computing more generally. While proponents of 'postcolonial computing' have pointed to the utility of certain ideas drawn from postcolonial studies for disclosing the persistence of colonial epistemologies – that is, colonial ways of knowing or 'coloniality' – in computing, discussions of the postcolonial condition tend to overlook the operation of global structural and institutional power in a racially-organised world system. 'Decolonial computing' is a recent proposal which attempts to rectify this shortcoming.

Practitioners and researchers adopting a decolonial computing perspective are required, at a minimum, to do the following: Firstly, consider their geo-political and body-political orientation when designing, building, researching or theorizing about computing phenomena; and secondly, embrace the 'decolonial option' as an ethics, attempting to think through what it might mean to design and build computing systems *with* and *for* those situated at the peripheries of the world system, informed by the epistemologies located at such sites, with a view to undermining the asymmetry of local-global power relationships and effecting the 'decentering' of Eurocentric / West-centric universals.

Decolonial computing is a very recent proposal at the fringes – or rather, *periphery* (borders, frontiers, margins) – of computing. It is presently somewhat under-theorised,

informed by a commitment to decolonial praxis and what might be described as an ‘open-source’ technopolitical orientation, asymmetries of power notwithstanding. It invites participation and contribution to its development while simultaneously being wary of co-option into the computing mainstream.

— **Ali, Syed Mustafa (2016). A Brief Introduction to Decolonial**

**Computing.** XRDS: Crossroads, The ACM Magazine for Students, 22(4) pp. 16–21

[http://oro.open.ac.uk/46718/1/\\_userdata\\_documents8\\_sma78\\_Desktop\\_A\\_Brief\\_Introduction\\_to\\_Decolonial\\_Compu.pdf](http://oro.open.ac.uk/46718/1/_userdata_documents8_sma78_Desktop_A_Brief_Introduction_to_Decolonial_Compu.pdf)



In terms of thinking more specifically about *Transhumanism* and/as Whiteness, I want to argue that Transhumanism/posthumanism should be viewed as a somewhat *different* response to the phenomenon of ‘White Crisis’, one that is techno-scientific and occurs in parallel with, albeit somewhat obscured by, the more overt phenomenon of conservative ‘White Backlash’ vis-à-vis socio-political phenomena associated with the response described earlier. In particular I want to argue that the shift described by Füredi and Bonnett from ‘white’ to ‘West’ is usefully framed in terms of the re-inscription—or rather, ‘algorithmic’ *re-iteration*—of whiteness under different signifiers including the techno-scientific signifier of Transhumanism associated with the convergence of GRIN/NBICS technologies; furthermore, that this shift in ‘whiteness’ needs to be situated within a longer historical frame than that going back to the late 19th century, arguably one that commences with the Columbian voyages in 1492 CE and results in the emergence of a racialized world system; moreover, a history involving *other* ‘paradigmatic’ shifts including those from ‘religious’ to ‘philosophical’ to ‘scientific’ and latterly ‘cultural’ expressions of race/racism/racialization, such transformations constituting re-articulations—or rather, ‘re-iterations’—of the difference between the human (European) and the sub-human (non-European). However, I argue that the contemporary moment is marked by a shift from the distinction between sub-human (non-European, non-white) and human (European, white) to that between human (non-European, non-white) and Transhuman (European, white), such shift being prompted, at least partly, by certain kinds of ‘critical’ posthumanist contestation of Eurocentric conceptions of the human against the much broader background or ‘horizon’ of a resurfacing of the phenomenon of ‘White Crisis’ (Against more optimistic—and, I would aver, somewhat naïve—postmodern, post-

structuralist, postcolonial and feminist readings of the cyborg as an emancipatory figure championing the destruction of borders, boundaries and binaries, and the embrace of hybridity, multiplicity and socio-political 'levelling' under a 'critical' posthumanism, I want to argue instead for viewing Cyborgism/Transhumanism as a techno-scientific response by whiteness to the perceived phenomenon of 'White Crisis' and mobilized by whiteness for purposes of maintaining Eurocentrism via refinement/adaptation and expansion under subaltern contestation. Drawing on recent mounting criticism of the so-called 'ontological turn' towards a non-anthropocentric, post-dualistic 'materialism', yet conceding that such a turn was at least partly motivated by a concern to address legacy political and ecological injustices associated with modern/colonial projects by engaging with postcolonial and other forms of critique, I maintain that 'critical' posthumanism ultimately proves to be rather 'brittle' and 'unstable' vis-à-vis its commitment to emancipation of, and reparations towards, the 'other' and that this is due to a tendency to conflate different conceptions of the posthuman, including those that upon close inspection can be shown to be Eurocentrically rationalist. I further argue that the hegemony of such Eurocentrically-rationalist conceptions of the posthuman, masked (or occluded) via their conflation with alternative variants of 'critical' posthumanism, enables the co-option and transformation of the latter into techno-scientific posthumanism, and that one means by which such transformation is facilitated is via their shared commitment to rather nebulous notions such as 'information' as ontologically basic.).

— Ali, Syed Mustafa (2017). **Transhumanism and/as Whiteness**. In: **IS4SI 2017 Summit Digitalisation for a sustainable society, 12-16 Jun 2017, Gothenburg, Sweden, MDPI (Multidisciplinary Digital Publishing Institute), pp.1–3, <http://oro.open.ac.uk/50351>**



Geologists have begun to call our time the Anthropocene, the epoch in which human disturbance outranks other geological forces. As I write, the term is still new—and still full of promising contradictions. Thus, although some interpreters see the name as implying the triumph of humans, the opposite seems more accurate: without planning or intention, humans have made a mess of our planet.<sup>6</sup> Furthermore, despite the prefix “anthropo-,” that is, human, the mess is not a result of our species biology. The most convincing Anthropocene time line begins not with our species but rather with the advent of modern capitalism, which has directed long-distance destruction of landscapes and ecologies. This time line, however, makes the “anthropo-” even more of a problem. Imagining the human since the rise of capitalism entangles us with ideas of progress and with the spread of techniques of alienation that turn both humans and other beings into resources. Such techniques have segregated humans and policed identities, obscuring collaborative survival. The concept of the Anthropocene both evokes this bundle of aspirations, which one might call the modern human conceit, and raises the hope that we might muddle beyond it. Can we live inside this regime of the human and still exceed it?

This is the predicament that makes me pause before offering a description of mushrooms and mushroom pickers. The modern human conceit won't let a description be anything more than a decorative

most, the Asian presence sparked local fears of invasion: journalists worried about violence.<sup>5</sup>

A few years into the new century, the idea of a trade-off between jobs and the environment seemed less convincing. With or without conservation, there were fewer “jobs” in the twentieth-century sense in the United States; besides, it seemed much more likely that environmental damage would kill all of us off, jobs or no jobs. We are stuck with the problem of living despite economic and ecological ruination. Neither tales of progress nor of ruin tell us how to think about collaborative survival. It is time to pay attention to mushroom picking. Not that this will save us—but it might open our imaginations.



Geologists have begun to call our time the Anthropocene, the epoch in which human disturbance outranks other geological forces. As I write, the term is still new—and still full of promising contradictions. Thus, although some interpreters see the name as implying the triumph of humans, the opposite seems more accurate: without planning or intention, humans have made a mess of our planet.<sup>6</sup> Furthermore, despite the prefix “anthropo-,” that is, human, the mess is not a result of our species biology. The most convincing Anthropocene time line begins not with our species but rather with the advent of modern capitalism, which has directed long-distance destruction of landscapes and ecologies. This time line, however, makes the “anthropo-” even more of a problem. Imagining the human since the rise of capitalism entangles us with ideas of progress and with the spread of techniques of alienation that turn both humans and other beings into resources. Such techniques have segregated humans and policed identities, obscuring collaborative survival. The concept of the Anthropocene both evokes this bundle of aspirations, which one might call the modern human conceit, and raises the hope that we might muddle beyond it. Can we live inside this regime of the human and still exceed it?

This is the predicament that makes me pause before offering a description of mushrooms and mushroom pickers. The modern human conceit won’t let a description be anything more than a decorative

democracy, growth, science, hope. Why would we expect economies to grow and sciences to advance? Even without explicit reference to development, our theories of history are embroiled in these categories. So, too, are our personal dreams. I'll admit it's hard for me to even say this: there might not be a collective happy ending. Then why bother getting up in the morning?

Progress is embedded, too, in widely accepted assumptions about what it means to be human. Even when disguised through other terms, such as "agency," "consciousness," and "intention," we learn over and over that humans are different from the rest of the living world because we look forward—while other species, which live day to day, are thus dependent on us. As long as we imagine that humans are *made* through progress, nonhumans are stuck within this imaginative framework too.

Progress is a forward march, drawing other kinds of time into its rhythms. Without that driving beat, we might notice other temporal patterns. Each living thing remakes the world through seasonal pulses of growth, lifetime reproductive patterns, and geographies of expansion. Within a given species, too, there are multiple time-making projects, as organisms enlist each other and coordinate in making landscapes. (The regrowth of the cutover Cascades and Hiroshima's radioecology each show us multispecies time making.) The curiosity I advocate follows such multiple temporalities, revitalizing description and imagination. This is not a simple empiricism, in which the world invents its own categories. Instead, agnostic about where we are going, we might look for what has been ignored because it never fit the time line of progress.

— Anna Tsing. *The Mushroom at the End of The World*. Duke University Press, Dec 2017.

simultaneously a hypothesis, a testable theory, a summary of highly specific facts, a worldview, and a philosophy of nature all mixed together.<sup>6</sup> Not to mention the claim made by some of its proponents that it might be a new religion or a new spirituality. This uncertainty explains the wide range of reactions triggered by any utterance of the word *Gaia*.

It is the aim of the present paper not to choose too fast what *Gaia* consists of because we claim that Lovelock's and Margulis's discovery might be just as unique as the object it tried to describe. In other words, *Gaia* might be the name of a shift in understanding of how to approach many phenomena of what was lumped together before in the notion of nature. This is why we are both—one coming from social science and the other from natural science— joining forces to keep open the possibility that we are dealing here with a change in what could be called a *world view*, by which we mean a distribution of traits affecting science, as well as politics, morality, and the arts. In brief, a cultural paradigm shift comparable in scope to the one introduced at the time of the scientific revolution by Galileo Galilei.

It is actually this shift in worldview that justifies our use of *Gaia* unapologetically in what follows—not in spite of but *because* of its mythological baggage. Even though many scientists have preferred ESS because it avoids any connection with mythology and the problem of evolutionary theory, we believe that *Gaia* is a distinct phenomenon and, because of its several meanings, maintains some of the radicality necessary to make both science and society tackle the new “climate of history.”<sup>7</sup> Although it has strictly the same etymology as *geo*, when it is used as a prefix in words like *Gaia-logy*, *Gaia-graphy*, *Gaia-chemistry* or *Gaia-politics*, *Gaia* focuses attention on the uniqueness of the situation at hand—uniqueness that we believe has not attracted enough scrutiny.<sup>8</sup> What the prefix *geo* downplays or ignores, *Gaia* forces us to underline again.

### **Gaia Theory Is Contemporary of the Anthropocene**

To fathom *Gaia*'s uniqueness, it is convenient to reflect first on the historical situation in which its formulation came about. It was so peculiar that it would be a mistake to try to establish too much continuity between *Gaia* and earlier views of the balance or harmony of nature. The idea was born in a setting marked by the

<sup>6</sup> See Sébastien Dutreuil, *Gaïa: hypothèse, programme de recherche pour le système Terre, ou philosophie de la Nature?* (PhD. diss., University of Paris 1, 2016) and, for an English summary, “James Lovelock’s Gaia Hypothesis: ‘A New Look at Life on Earth’ . . . for the Life and the Earth Sciences,” in *Dreamers, Visionaries, and Revolutionaries in the Life Sciences*, ed. Oren Harman and Michael R. Dietrich, (Chicago, 2018), pp. 272–88.

<sup>7</sup> See Chakrabarty, “The Climate of History.”

<sup>8</sup> Actually, as one of us has shown elsewhere, *Gaia* carries a lighter and more secular baggage than the highly complex and multi-layered notion of nature; see Bruno Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime*, trans. Catherine Porter (Medford, Mass., 2017).



explosion of wholly new technical and industrial infrastructure. Not only was its formulation strictly contemporary with what was later called the Anthropocene, but, in addition, its first description by Lovelock depended fully on an analysis of how *human industry* had been able to modify the chemical balance of the Earth at a global scale.<sup>9</sup>

As has been told many times by Lovelock and described by Dutreuil in great detail, the invention of exquisitely sensitive instruments—especially the electron capture detector—allowed Lovelock to quantify the extent of *industrial pollution* in a new way. His inventions were used to detect the global spread of anthropogenic pollutants, including DDT and later CFCs. And it was Lovelock's resulting reputation for instrument design that led NASA to employ him in the design of life detection experiments for what were to become the Viking missions to Mars. As is well known, Lovelock puts his Eureka moment of discovering Gaia in 1965, while working for NASA at the Jet Propulsion Laboratory in Pasadena, California.<sup>10</sup> In many ways, his insight to look at the Earth as if from Mars was to extend to *all life forms* the analogy that their disseminations of chemical by-products were like those of modern factories.

In brief, Gaia was discovered through a level of human technology and the self-awareness of the planetary consequences of that technology, which coincides with the start of what has been called the Great Acceleration and is one of the dates chosen for the beginning of the Anthropocene.<sup>11</sup> So, if the concept of Gaia is unique, it is largely because it was born in the middle of the extraordinary ambiance of the postwar high-technology boom and space missions.<sup>12</sup> It can almost be said that, conceptually, the idea of the Anthropocene *precedes* Gaia, even though, obviously, when the long history of the planet is told, the Anthropocene is portrayed as no more than a short episode within the deep history of Gaia.

Such an original birth might explain why the search for predecessors does not help much in clarifying the innovation. Several attempts to orient Gaia within preceding traditions of scientific thought have been fairly misleading. Gaia is not continuous with older ideas of the *balance* or *order* of nature. It is true that Lovelock credits James Hutton's idea that the Earth is like an animal which repairs itself as an inspiration.<sup>13</sup> But what Hutton was describing was the cycling of sedimentary rocks, without any particular agency for life or any real notion of

<sup>9</sup> See Christophe Bonneuil and Jean-Baptiste Fressoz, *The Shock of the Anthropocene: The Earth, History and Us*, trans. David Fernbach (New York, 2016).

<sup>10</sup> See Lovelock, *Homage to Gaia: The Life of an Independent Scientist* (New York, 2001).

<sup>11</sup> See Colin N. Waters et al., "The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene," *Science*, 8 Jan. 2016, [science.sciencemag.org/content/351/6269/aad2622](http://science.sciencemag.org/content/351/6269/aad2622)

<sup>12</sup> See the remarkable *The Whole Earth Catalog. California and the Disappearance of the Outside*, ed. Dietrich Diederichsen and Anselm Franke (exhibition catalog, Haus der Kulturen der Welt, Berlin, 2013).

<sup>13</sup> See Martin J. S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago, 2005).

— Bruno Latour and Timothy M. Lenton, *Extending the Domain of Freedom, or Why Gaia Is So Hard to Understand*, 2018

Prepublication in *Critical Enquiry*:

[https://criticalinquiry.uchicago.edu/extending\\_the\\_domain\\_of\\_freedom/](https://criticalinquiry.uchicago.edu/extending_the_domain_of_freedom/)



## **II. Highlights of the interactive dialogue of the General Assembly on Harmony with Nature to commemorate International Mother Earth Day**

4. On 23 April 2018, the General Assembly held its eighth interactive dialogue on Harmony with Nature at United Nations Headquarters in commemoration of International Mother Earth Day.<sup>3</sup> The theme of the dialogue was “Earth jurisprudence in the implementation of sustainable production and consumption patterns in harmony with nature”. The morning and afternoon panels included the participation of members of the Harmony with Nature Knowledge Network.<sup>4</sup>

5. In his opening remarks, the President of the General Assembly acknowledged the extreme toll that current levels and patterns of consumption and production had taken on human lives, well-being and health, and on the health of the planet. The President emphasized that living in harmony with nature implied balance, and that significant changes to the world’s economic and legal systems were required in order to reverse the dominant current production and consumption patterns and attain the targets proposed under the Sustainable Development Goals.

6. The Permanent Representative of Ecuador emphasized that the environmental crises were precipitated by the social, economic, productive and technological transformations brought about by the modern capitalist world, which undermined the balance between humanity and nature. Human existence depended on restoring that balance, and Ecuador had enshrined the concept of “Buen Vivir” (living well) in its 2008 Constitution, in which respect for nature is required and the rights of nature are recognized.

9. A member of the European Parliament stated that humans were still learning how to understand their place in nature and the rights and roles of other living and non-living beings. A lack of understanding and a silo mentality prevented humans from seeing themselves as living ecosystems embedded in larger living systems. The challenge was how to instil an Earth-centred world view using a rights-based approach. Putting a stop to the overconsumption of natural resources might require new legislative frameworks on the environment or a convention regarding nature to complement the Universal Declaration of Human Rights, and the United Nations was best placed to take the lead on that issue.

10. Another member of the European Parliament noted that the extreme environmental crises required a shift in people’s thinking and a fundamental change in the economic system to reflect the intrinsic value of nature, which extended far beyond ecosystem services. The current legal system was not working because the notion of “rights” was too narrow; it must be broadened to extend rights to future generations and to nature. A deep paradigm shift occurs when a theoretical legal approach is replaced by tangible instances in which rights have been extended to natural entities, for example the initiative to give legal standing to Lake Balaton in Hungary.

17. Members of the Harmony with Nature Knowledge Network explained that indigenous peoples worldwide had historically understood the reciprocal and mutually sustaining relationship between humans and all other entities that are part of Mother Earth on the basis of gratitude and respect. One participant shared the experience of the Tūhoe, a Māori iwi (tribe) in New Zealand, which had signed a treaty with the Government recognizing its kinship with elements of nature and recognizing Te Urewera, its historical home, as a living, spiritual being with legal personhood. Similarly, the Constitutional Court of Colombia had recognized the Atrato River and its tributaries as living entities that support other forms of life and culture, making them a subject with rights and deserving of special protection.

### **III. Trends in the implementation of Earth-centred law**

#### **A. National legislation adopted to grant rights of nature**

30. In India, the decision of the High Court of Uttarakhand to grant rights to the Ganges and Yamuna Rivers, as well as to the Himalayan glaciers within India, inspired the adoption of a resolution by the Legislative Assembly of Madhya Pradesh on 4 May 2017 declaring the Narmada River a living entity and the lifeline of the State. In addition, on 4 July 2018, the High Court of Uttarakhand passed a judgment in which it recognized all animals as legal persons with rights and named all citizens of Uttarakhand as legal guardians with the ability to speak on behalf of animals.

34. In South Africa, the Supreme Court of Appeal issued a judgment on 1 June 2018 supporting the customary law rights of the Dwesa-Cwebe indigenous communities to harvest mussels on the east coast of the country in accordance with their own ancient

system. The communities were able to prove the continued existence of their ancient laws governing fishing and the extraction of mussels, which ensure the healthy survival of the mussel community. The judgement confirmed that customary law and communal ownership systems that had existed long before colonial interventions should be given due authority and respect.

## **B. Ongoing national legislation granting rights of nature**

35. In Brazil, the lawyer Lafayette Sobrinho and the NGO Pachamama filed a lawsuit on behalf of the Doce River, located in the state of Mina Gerais, on 5 November 2017. The request for legal protection of the Doce River was submitted in response to the Bento Rodrigues dam disaster, which occurred on 5 November 2015 and is described as the worst environmental disaster in the history of Brazil. The disaster sparked a humanitarian crisis, as hundreds of people were displaced. It is estimated that around 60 million cubic meters of iron waste flowed into the Doce River, with toxic contamination reaching the Atlantic Ocean.

36. In the city of Fortaleza, Brazil, a public hearing was held on pressing environmental issues raised by communities and local legislators, followed by debates between representatives of academia and civil society. A draft bill on the recognition of the rights of nature is currently being proposed.

37. In France, the Government has initiated a reform to further amend the Constitution of 1958 and the Charter of the Environment of 2004 to include more ecological considerations. Various members of Parliament have tabled over 20 amendments addressing a range of topics, including the rights of living entities, animal welfare, the global commons, the crime of ecocide and the principle of non-environmental regression, thus signalling a trend towards a more Earth-centred constitutional process.

## **C. Policy trends relating to the rights of nature**

43. In Sweden, the Sami Parliament endorsed the Universal Declaration of the Rights of Mother Earth on 25 May 2018.<sup>7</sup> The Sami, like other indigenous peoples, experience the effects of climate change on their traditional ways on a daily basis. The parliamentary motion, drafted by two female members of the Sami Parliament, stated:

“We believe a paradigm shift is needed towards a view where humans understand that we are all part of nature, which is the way indigenous peoples relate to nature. We, the Sami people, believe that we belong to the land, not the other way around.”

44. In Uganda, the group Advocates for Natural Resources and Development is working with the Committee on Natural Resources to develop a stronger understanding of Earth jurisprudence and with parliamentarians to promote the inclusion of rights of nature in the National Environment Act.

50. To protect rivers, the Earth Law Center has updated the draft universal declaration of river rights on the basis of input from experts in the rights of nature worldwide. The declaration now forms the basis of laws being drafted in countries throughout the world. It has been cited in an amicus brief in Argentina and in an amicus brief seeking legal rights for the Anchicayá River in Colombia, presented to the Inter-American Commission on Human Rights and to the Council of State of Colombia by the Earth Law Center, International Rivers and the International Network of Human Rights.

## **IV. Education on Earth jurisprudence**

### **A. Formal education on Earth jurisprudence**

60. In Montreal, Canada, McGill University continues to strengthen the “Economics for the Anthropocene” programme, a graduate research and training partnership that involves 25 institutions, 80 collaborators and 40 graduate student fellows. The premise of this law and governance research initiative, which is coordinated closely with the Ecological Law and Governance Association, is the need to reframe law and governance towards a mutually enhancing human-Earth relationship, with rigorous reliance on contemporary science and traditional knowledge systems.

### **B. Informal education and public engagement on Earth jurisprudence**

85. In Bali, Indonesia, in April 2018, the Green School hosted a one-week Green Educator Course for a group of nearly 40 teachers, directors and employees from educational institutions in different countries. The course included workshops on the United Nations Harmony with Nature programme and on the theme “Rights and voice

of Mother Earth”, and participating teachers committed themselves to including Earth jurisprudence in school curricula from kindergarten to high school.

## **V. Conclusion**

107. Finally, the approaches and actions being taken by Member States, civil society groups and other stakeholders to foster sustainable living in harmony with nature will continue to be showcased and supported through the Harmony with Nature website ([www.harmonywithnatureun.org](http://www.harmonywithnatureun.org)).

— **United Nations General Assembly, Harmony with Nature. Report of the Secretary-General (A/73/221), 23 July 2018**

<http://undocs.org/A/73/221>



The problem of the end of the world is always formulated as a separation or divergence, a divorce or orphaning resulting from the disappearance of one pole in the duality of world and inhabitant—the beings whose world it is. In our metaphysical tradition, this being tends to be the “human,” whether called *Homo sapiens* or *Dasein*. The disappearance may be due to either physical extinction or one pole’s absorption by the other, which leads to a change in the persisting one. We could schematically present this as an opposition between a “world without us,” that is, a world after the end of the human species, and an “us without world,” a humanity bereft of world or environment, a persistence of some form of humanity or subjectivity after the end of the world.

But to think the future disjunction of world and inhabitant inevitably evokes the origin of its present, precarious conjunction. The end of the world projects backward a beginning of the world; the future fate of humankind transports us to its emergence. The existence of a world before us, although regarded as a philosophical challenge by some (if Meillassoux’s subtle argument is to be believed), seems easy enough for the average person to imagine. The possibility of an us before the world, on the other hand, is less familiar to the West’s mythological repertoire.

Yet it is a hypothesis explored in several Amerindian cosmogonies. It finds itself conveniently summarized in the commentary that opens a myth of the Yawanawa, a people of Pano-speakers from the western Amazon: “The myth’s action takes place in a time in which ‘nothing yet was, but people already existed.’”

The variation of the Aikewara, a Tupian-speaking people who live at the other end of the Amazon, adds a curious exception: “When the sky was still very close to the Earth, there was nothing in the world except people—and tortoises!”

At first, then, everything was originally human, or rather, nothing was not human (except for tortoises, of course, according to the Aikewara). A considerable number of Amerindian myths—as well as some from other ethnographic regions—imagine the existence of a primordial humankind, whether fabricated by a demiurge or simply presupposed as the only substance or matter out of which the world could have come to be formed.

These are narratives about a time before the beginning of time, an era or eon that we could call “pre-cosmological.”

These primordial people were not fully human in the sense that we are, since, despite having the same mental faculties as us, they possessed great anatomic plasticity and a certain penchant for immoral conduct (incest, cannibalism). After a series of exploits, some groups of this primordial humankind progressively morphed—either

spontaneously or due to the action of a demiurge—into the biological species, geographical features, meteorological phenomena, and celestial bodies that comprise the present cosmos. The part that did not change is the historical, or contemporary, humankind.

One of the best illustrations of this general type of cosmology is described in great detail in the autobiography of Yanomami shaman and political leader Davi Kopenawa. We could also recall ideas from the Ashaninka (Campa), an Arawak people both geographically and culturally distant from the Yanomami:

*Campa mythology is largely the story of how, one by one, the primal Campa became irreversibly transformed into the first representatives of various species of animals and plants, as well as astronomical bodies or features of the terrain ... The development of the universe, then, has been primarily a process of diversification, with mankind as the primal substance out of which many if not all of the categories of beings and things in the universe arose, the Campa of today being the descendants of those ancestral Campa who escaped being transformed.*

We could also mention the cosmogony of the Luiseño from California, evoked in *The Jealous Potter* by Claude Lévi-Strauss, in which the cultural hero Wyiot differentiates the originary human community into the various species of currently existing beings. The theme is also found in some non-Amerindian cultures: for example, the Kaluli from Papua New Guinea recount that “at that [pre-cosmological] time, according to the prevailing story, there were no trees or animals or streams or sago or food. The Earth was covered entirely by people.” A man of authority (a big man) then decided to transform the different groups of people into different species and other natural phenomena: “those who were left aside became the ancestors of human beings.” We can see how, in Amerindian thought (and some others), humankind or personhood is both the seed and the primordial ground, or background, of the world. *Homo sapiens* is not the character who comes to crown the Great Chain of Being by adding a new ontological layer (spiritual or “cognitive,” in modern parlance) on top of a previously existing organic layer that would, in turn, have emerged out of a substrate of “dead” matter. In the West’s mythophilosophical tradition, we tend to conceive animality and nature in general as referring essentially to the past. Animals are living arche-fossils, not only because beasts roamed the Earth long before we did (and because these archaic beasts were like magnified versions of present animals), but because the human species has its origin in species that are closer to pure animality the more we recede in time.

By virtue of a felicitous innovation—bipedalism, neoteny, cooperation—the Great Watchmaker, whether blindly or omnisciently, conferred upon us a capacity that made



us into more-than-organic beings (in the sense of Alfred Kroeber's "superorganic"), endowed with that spiritual supplement that is "proper to man": the species' precious private property. Human exceptionalism, in short: language, labor, law, desire; time, world, death. Culture. History. Future. Humans belong to the future like animals belong to the past—our past, since animals themselves are, as far as we are concerned, trapped inside an exiguous world within an immobile present.

Yet that is not, as we can see, how things go as far as these other humans who are the Amerindians and other non-modern humankinds are concerned. One of the things that make them other consists precisely in the fact that their concepts of the human are other to our own. The world as we know it, or rather the world as the indigenous knew it, is the present world that exists (or existed) in the interval between the time of origins and the end of times—the intercalary time that we could call the "ethnographic present" or the present of ethnos, as opposed to the "historical present" of the nation-state. Our present world that exists is conceived in some Amerindian cosmologies as the epoch that began when pre-cosmological beings suspended their ceaseless becoming-other (erratic metamorphoses, anatomic plasticity, "unorganized" corporeality) in favor of greater ontological univocality.

Putting an end to the "time of transformations"—a common expression among Amazonian cultures—those unstable anthropomorphs who lived at the origins took on the forms and bodily dispositions of those animals, plants, rivers, and mountains that they would eventually come to be. This was, in fact, already prefigured in the names they bore in the absolute past; thus, for example, the Peccary Yanomami—the tribe of originary people who had the name "Peccary" [queixada]—became the term "peccary," that is, the wild pigs that we hunt and eat today (Yanomani means "people" in their language). The whole world (though again, perhaps not the tortoise or some other oddity) is virtually included in this originary proto-humankind; the pre-cosmological situation might thus be indifferently described as a still worldless humankind or as a world in human form, an anthropomorphic multiverse that gives way to a world conceived as the result of the (never quite finished) stabilization of the infinite potential for transformation contained in humankind as universal substance, or rather universal "actance," both originary and persistent.

We thus see a multiple inversion of the cannibalistic or zombie-apocalypse scenarios that figure in Cormac McCarthy's *The Road* and similar narratives: in indigenous mythology, human food consists of humans who morphed into animals and plants; humankind is the active principle at the origin of the proliferation of living forms in a rich, plural world. But the indigenous scheme is also an inversion of the Garden of Eden myth: in the Amerindian case, humans are the first to come, and the rest of

creation proceeds from them. It is as if what comes from Adam's rib is much more than his female complement—rather it is the whole world, the entire infinite rest of it. And names, in their infinite variety, existed, as we have seen, before-alongside things (the Pecari Yanonami, the Jaguar People, the Canoe People ... ); things did not wait for a human arche-namegiver to tell them what they were. Everything was first human, but everything was not one. Humankind was a polynomial multitude; it appeared from the start in the form of an internal multiplicity whose morphological externalization—that is, speciation—is precisely what provided the cosmogonic narrative. It is Nature that is born out of or separates itself from Culture, not the other way round, as in our anthropology and philosophy.

We can therefore see that the subsumption of the world by humankind in Amerindian cosmologies travels in the opposite direction to that of the myth of technological Singularity. It refers to the past, not the future; its emphasis is on the stabilization of the transformations that came to differentiate animals from those humans who continued to be so, and not the acceleration of the transformation of the animals we were into the machines we will be.

Indigenous praxis emphasizes the regulated production of transformations capable of reproducing the ethnographic present (life-cycle rituals, the metaphysical management of death, shamanism as cosmic diplomacy), thus thwarting the regressive proliferation of chaotic transformations. Control is necessary because the world's transformative potential, as attested to by the omnipresent traces of a universal anthropomorphic intentionality and its actions, manifests a residual magnetism that is at once dangerous and necessary. Danger lies in the fact that former humans retain a human virtuality underneath their present animal, vegetal, astral appearance, in a similar (but symmetrically opposed) way to how we often fantasize about being wild animals deep down under our civilized guise.

Nonhumans' archaic humanoid latency—humanity as the animal unconscious, we could say—constantly threatens to break through the openings and tears in the fabric of the everyday world (dreams, illnesses, hunting incidents), violently reabsorbing humans back into the pre-cosmological substrate where all differences continue to chaotically communicate with each other.

In turn, the necessity of this residual magnetism lies in the fact that the actualization of the ethnographic present presupposes a recapitulation or counter-effectuation of the pre-cosmological state, because that is the reservoir of all difference, all dynamism, and therefore all possibility of sense.

The anthropomorphic multiverse, in its originary virtuality, is thus both conjured and kept at bay by an animalization of the human—the theriomorphic mask of the spirit-

dancer, the becoming-beast of the warrior—which is reciprocally a mythical humanization of the animal. It is from this double movement that ethnos ceaselessly emerges. The ethnographic present is in no way an immobile “time”; slow societies know infinite speeds, extrahistorical accelerations—in short, becomings—that make the indigenous concept of *buen vivir* (“good life”) something metaphysically closer to extreme sports than to a relaxed retirement in the countryside.

What we could call the natural world, or “world” for short, is for Amazonian peoples a multiplicity of intricately connected multiplicities. Animal species and other species are conceived as so many kinds of people or peoples, that is, as political entities. It is not “the jaguar” that is human; it is individual jaguars that take on a subjective dimension (more or less pertinent according to the practical context of interaction) when they are perceived as having a society behind them, a collective political alterity. To be sure, we too—by which we mean we Westerners, a concept that includes, through mere convention, Brazilians of European descent—think, or would like to think that we think, that it is only possible to be human in society, that man is a political animal. But Amerindians think that there are many more societies (and therefore also humans) between heaven and Earth than have been dreamt by our philosophy and anthropology.

What we call the environment is for them a society of societies, an international arena, a cosmopoliteia. There is, therefore, no absolute difference in status between society and environment, as if the first were the subject and the second the object. Every object is always another subject, and is always more than one. The platitude that every novice left-wing militant learns—that everything is political—acquires in the Amerindian case a radical concreteness (for the indeterminacy of this “everything,” see our famous tortoises!) that not even the most enthusiastic activist in the streets of Copenhagen, Rio, or Madrid might be ready to acknowledge.

**— Déborah Danowski & Eduardo Viveiros de Castro — Is There Any World to Come?**

Translated by Rodrigo Nunes, 2015, e-flux and the author

This is an excerpt of Déborah Danowski and Eduardo Viveiros de Castro’s *Há mundo por vir? Ensaio sobre os medos e os fins* (Cultura e Barbárie, 2014; English translation forthcoming, Polity Press, 2016).



## TECHNOLOGY



The field of meta-heuristic search algorithms has a long history of finding inspiration in natural systems. Starting from classics such as Genetic Algorithms and Ant Colony Optimization, the last two decades have witnessed a fireworks-style explosion (pun intended) of natural (and sometimes supernatural) heuristics - from Birds and Bees to Zombies and Reincarnation.

<https://github.com/fcampelo/EC-Bestiary>



When you cook bread from a recipe, you're following an algorithm. When you knit a sweater from a pattern, you're following an algorithm. When you put a sharp edge on a piece of flint by executing a precise sequence of strikes with the end of an antler—a key step in making fine stone tools—you're following an algorithm. Algorithms have been a part of human technology ever since the Stone Age.

—**Christian & Griffiths, Algorithms to Live By: The Computer Science of Human Decisions**



Symmetry breaking (algorithmic technique)

To differentiate parts of a structure, such as a graph, which locally look the same to all vertices. Usually implemented with randomization.

<https://www.nist.gov/dads/HTML/symmetrybrek.html>

Antichain (definition)

A subset of mutually incomparable elements in a poset.

<https://www.nist.gov/dads/HTML/antichain.html>

Bloom filter (data structure)

A data structure with a probabilistic algorithm to quickly test membership in a large set using multiple hash functions into a single array of bits.

<https://www.nist.gov/dads/HTML/bloomFilter.html>

## O

Hydrological Cycle Algorithm (HCA) simulates nature's hydrological water cycle. More specifically, it involves a collection of water drops passing through different phases such as flow (runoff), evaporation, condensation, and precipitation to generate a solution. It can be considered as a swarm intelligence optimization algorithm for some parts of the cycle when a collection of water drops moves through the search space. But it can also be considered an evolutionary algorithm for other parts of the cycle when information is exchanged and shared. By using the full hydrological water cycle as a conceptual framework, we show that previous water-based algorithms have predominantly only used swarm-like aspects inspired by precipitation and flow. HCA, however, uses all four stages that will form a complete water-based approach to solving optimization problems efficiently. In particular, we show that for certain problems HCA leads to improved performance and solution quality.

<https://doi.org/10.1155/2017/3828420>

## O

“The article is a situated response to the way optimization systems structurally disregard non-users, non-humans and environments that do not represent any potential socio-economic profit. It analyses the different ways/scales algorithmic processes externalize risk and attention, and proposes 'Protective Optimisation Technologies', counter-algorithmic strategies that change the frame to include 'externalities' in order to expose these operations.”

## ABSTRACT

In spite of their many advantages, optimization systems often neglect the economic, ethical, moral, social, and political impact they have on populations and their environments. In this paper we argue that the frameworks through which the discontents of optimization systems have been approached so far cover a narrow subset of these problems by (i) assuming that the system provider has the incentives and means to mitigate the imbalances optimization causes, (ii) disregarding problems that go beyond discrimination due to disparate treatment or impact in algorithmic decision making, and (iii) developing solutions focused on removing algorithmic biases related to discrimination.

In response we introduce Protective Optimization Technologies: solutions that enable optimization subjects to defend from unwanted consequences. We provide a framework that formalizes the design space of POTs and show how it differs from other

design paradigms in the literature. We show how the framework can capture strategies developed in the wild against real optimization systems, and how it can be used to design, implement, and evaluate a POT that enables individuals and collectives to protect themselves from unbalances in a credit scoring application related to loan allocation.

## 1 MOTIVATION

We are facing a new type of digital system whose organizing principle is optimization. These systems became the dominant paradigm, as software engineering shifted from packaged software and PCs to services and clouds, enabling distributed architectures that incorporate real-time feedback from users [30].

Through this process, digital systems became layers of technologies, metricized under the authority of objective functions. These functions drive, among others, the selection of software features, the orchestration of cloud usage, and the design of user interaction and growth planning [24]. In contrast to traditional information systems, which treat the world as a static place to be known and focus on storage, processing, transport, and organizing information, optimization systems consider the world as a place to sense and co-create. They seek maximum extraction of economic value by optimizing the capture and manipulation of people's activities and environments [1, 13].

Optimization systems apply a logic of operational control that focuses on outcomes rather than the process [46]. While this introduces efficiency and allows systems to scale, they also pose social risks and harms such as social sorting, mass manipulation, majority dominance, and minority erasure. In the vocabulary of optimization, these systems create substantial externalities that arise due to the inadequacy of their objective functions to address the world.

Moreover, optimization systems hold great potential to shift power. The fast pace at which they manipulate users and environments obscures their effect, making it difficult to devise strategies to contest them. Optimization also often leads to asymmetrical concentration of resources in the hands of a few companies which can collect large scale data and muster the computational power to process these in the pursuit of financial gain [28, 46]. This centralizes governance and reconfigures market structures, creating an imbalance of power that benefits a select portion of society. Fairness frameworks, we claim, have come to being as a response to the rise of optimization systems. They aim at solving associated problems, but often don't provide an in-depth characterization of these systems. To address this gap, we take a step back to gain a better understanding of the problem that fairness intends to

respond to. We explore some fundamental shifts in the way digital systems are engineered to organize the world around us. We find that the problems that may arise are much greater than algorithmic unfairness, and that they cannot simply be solved by diligent service providers. Instead, they require new mental models and techniques to reason about strategies to counter them.

Specifically, we introduce Protective Optimization Technologies (POTs) which enable those affected by optimization systems to influence, alter, and contest these systems from the outside. We show how POTs are different from other protective technologies. We demonstrate the suitability of our framework by showing how it can encompass existing protection strategies, and how it can be used to design new POTs, using credit scoring as a use case. Finally, we discuss the limitations and challenges involved in the design and deployment of POTs.

## 2 THE OPTIMIZATION PROBLEM

We call optimization systems those systems that capture and manipulate user behavior and environments under the logic of optimization. That is, systems whose operation relies on an optimization algorithm. For instance, ride sharing -applications such as Uber, which rely on optimization to decide on the pricing of rides; navigation applications such as Waze, which rely on optimization to propose best routes; banks, which rely on optimization to decide whether to grant a loan; and advertising networks, which rely on optimization to decide what is the best advertisement to show to a user.

In this section, we start with an overview of those aspects and challenges of optimization system design that result in the common negative outcomes that usually surface during deployment - that are typically (dis)regarded as ‘externalities’— and end with an evaluation of the ability of service providers to mitigate these.

### 2.1 Externalities of Optimization Systems

We first present an overview of ‘externalities’ of optimization system design that result in common negative outcomes, risks and harms that usually surface during deployment. Externalities refer to situations when the actions of a group of agents, e.g., consumption, production and investment decisions, have “significant repercussions on agents outside of the group” [50]. The following are some of the common externalities intrinsic to optimization systems:

Disregard for non-users and environments. Optimizing the service for targeted users results in non-users and inhabitants of environments affected by the system being outside the optimization model. Traffic and navigation services only take into account

their users and how to move them the fastest through the city, exposing non-users, i.e., people that do not use the service, to heavier traffic. Hence, residents of streets that were neither intended nor designed for heavy or non-local traffic experience externalities [33].

Disregard for certain users. Many optimization systems provide the most benefit to a subset of “high-value” users or to a particular population segment that does not match their complete user base. For instance, in the popular augmented reality mobile game Pokémon Go the placement of Pokémon and in-game resource stations rely on real world locations and maps, heavily benefiting players in urban areas and leaving players in rural areas and black neighborhoods starved of rarer Pokémon and resources [27, 54].

Externalization of exploration risks to users and environments. Optimization systems benefit from experimentation to reduce risks associated with environmental unknowns. Common practices in software engineering such as trialling new features through A/B testing involve experimentation on users. However, exploration often means that risks stemming from unknowns are pushed to users and their surroundings [5], a problem exacerbated by the trend of frequent system updates and real time optimization. Distributional shift. Optimization systems built on data from a particular area or “domain” may underperform or downright flounder when deployed in a different environment [51], e.g., a voice recognition algorithm that is only trained on men’s voices fails to recognize women’s voices [35, 47].

Unfair distribution of errors. As with distributional shift, this results in disproportionate allocation of errors to a minority group [26]. Here the cause is that optimization algorithms learn to maximize success by favoring the most likely option, i.e., they can misclassify minorities while maintaining high accuracy. Therefore, minorities underrepresented in training do not perform well under deployment. For example, facial recognition algorithms are known to misclassify faces of black women because of this issue [7].

Promotion of unintended actions to fulfill intended outcomes. Systems may find shortcuts to their optimization goals, also known as “reward hacking” [2], e.g., an autonomous vehicle recklessly tailing an ambulance to decrease travel time, or electricity grid manager choosing to cause a blackout in order to save energy [49].

Mass data collection. Optimization systems need massive amounts of data to function. The concentration of resources and power in data holders enables more accurate inferences about populations and individuals using the data. However, it puts the privacy of the individuals whose data is input to the optimization at risk, as it can be leaked through interactions with the system [55].



(...)

### 3 PROTECTIVE OPTIMIZATION TECHNOLOGIES

We consider that optimization systems operate on users' inputs and interact with the environment in which they are deployed. The system's outputs thus affect both users and environments, at both individual and collective levels. We leave the definition of environment open so as to cover any object, human, individual or collective, e.g., non-users that do not directly interact with the optimization system.

In this context, we introduce POTs—technological solutions that those outside of the optimization system deploy to protect users and environments from the negative effects of optimization. POTs build on the idea that optimization systems infer, induce and shape events in the real world to fulfill objective functions. POTs analyze how events (or lack thereof) affect users and environments, then reconfigure these events to influence system outcomes, e.g., by altering the optimization constraints or poisoning the system inputs. We specifically conceive POTs to address the negative externalities of optimization. To this end, POTs take a holistic perspective, considering the interaction of the algorithm with the rest of the optimization system and the environment.

— **Rebekah Overdorf, Bogdan Kulynych, Ero Balsa, Carmela Troncoso, Seda Gürses.** POTs: Protective Optimization Technologies

<https://arxiv.org/pdf/1806.02711>

○

This book is written in the shadow of the millennium, that arbitrary but incontestable line that the Western imagination has drawn in the sands of time. It is also written in the conviction that one hardly needs to be decked out in a biblical sandwich board or wired to the gills with the latest cyborg gear to feel the glittering void of possibility and threat growing at the heart of our profoundly technologized society. Even as many of us spend our days, in that now universal CaUforniaism, surfing the datastream, we can hardly ignore the deeper, more powerful and more ominous undertows that tug beneath the froth of our lives and labors.

You know the scene. Social structures the world over are melting down and mutating, making way for a global Me Village, a Gaian brain, and a whole heap of chaos. The emperor of technoscience has achieved dominion, though his clothes are growing more threadbare by the moment, the once noble costume of Progress barely concealing far more wayward ambitions. Across the globe, ferocious postperestroika capitalism yanks the rug out from under the nation-state, while the planet spits up signs and symptoms of terminal distress. Boundaries dissolve, and we drift into the no-man's zones between synthetic and organic life, between actual and virtual environments, between local communities and global flows of goods, information, labor, and capital. With pills modifying personality, machines modifying bodies, and synthetic pleasures and networked minds engineering a more fluid and invented sense of self, the boundaries of our identities are mutating as well. The horizon melts into a limitless question mark, and like the cartographers of old, we glimpse yawning monstrosities and mind-forged utopias beyond the edges of our paltry and provisional maps.

Regardless of how secular this ultramodern condition appears, the velocity and mutability of the times invokes a certain supernatural quality that must be seen, at least in part, through the lenses of religious thought and the fantastic storehouse of the archetypal imagination. Inside the United States, within whose high-tech bosom I quite self-consciously write, the spirit has definitely made a comeback—if it could be said to have ever left this giddy, gold rush land, where most people believe in the Lord and his coming kingdom, and more than you'd guess believe in UFOs. Today God has become one of Time's favorite cover boys, and a Black Muslim numerologist can lead the most imaginative march on the nation's capital since the Yuppies tried to levitate the Pentagon. Self-help maestros and corporate consultants promulgate New Age therapies, as strains of Buddhism both scientific and technicolor seep through the intelligentsia, and half the guests on Oprah popup wearing angel pins. The surge of interest in alternative medicine injects non-Western and ad hoc spiritual practices into the mainstream, while deep ecologists turn up the boil on the nature mysticism long simmering in the American soul. This rich confusion is even more evident in our brash popular culture, where science-fiction films, digital environments, and urban tribes are reconfiguring old archetypes and imaginings within a vivid comic-book frame. From The X-Files to occult computer games, from Xena: Warrior Princess to Magic: The Gathering playing cards, the pagan and the paranormal have colonized the twilight zones of pop media.

These signs are not just evidence of a media culture exploiting the crude power of the irrational. They reflect the fact that people inhabiting all frequencies of the socioeconomic spectrum are intentionally reaching for some of the oldest navigational tools known to humankind; sacred ritual and metaphysical speculation, spiritual regimen and natural spell. For some superficial spiritual consumers, this means prepackaged answers to the thorny questions of life; but for many others, the quest for meaning and connection has led individuals and communities to construct meaningful frameworks for their lives, worldviews that actually deepen their willingness and ability to face the strangeness of our days.

So here we are: a hypertechnological and cynically postmodern culture seemingly drawn like a passel of moths toward the guttering flames of the premodern mind. And it is with this apparent paradox in mind that I have written *TechGnosis: a secret history of the mystical impulses that continue to spark and sustain the Western world's obsession with technology, and especially with its technologies of communication*. My topic may seem rather obscure at first, for common sense tells us that mysticism has no more in common with technology than the twilight cry of wild swans has with the clatter of Rock'em Sock'em Robots.

Historians and sociologists inform us that the West's mystical heritage of occult dreamings, spiritual transformations, and apocalyptic visions crashed on the scientific shores of the modern age. According to this narrative, technology has helped disenchant the world, forcing the ancestral symbolic networks of old to give way to the crisp, secular game plans of economic development, skeptical inquiry, and material progress. But the old phantasms and metaphysical longings did not exactly disappear. In many cases, they disguised themselves and went underground, worming their way into the cultural, psychological, and mythological motivations that form the foundations of the modern world. As we will see throughout this book, mystical impulses sometimes body-snatched the very technologies that supposedly helped yank them from the stage in the first place. And it is these technomystical impulses—sometimes sublimated, sometimes acknowledged, sometimes masked in the pop detritus of science fiction or video games—that *Tech Gnosis* seeks to reveal.

For well over a century, the dominant images of technology have been industrial: the extraction and exploitation of natural resources, the mechanization of work through the assembly line, and the bureaucratic command-and-control systems that large and impersonal institutions favor. Lewis Mumford called this industrial image of technology the “myth of the machine,” a myth that insists on the authority of technical and

scientific elites, and in the intrinsic value of efficiency, control, unrestrained technological development, and economic expansion. As many historians and sociologists have recognized, this secular image was framed all along by Christian myths: the biblical call to conquer nature, the Protestant work ethic, and, in particular, the millennialist vision of a New Jerusalem, the earthly paradise that the Book of Revelation claims will crown the course of history. Despite a century of Hiroshimas, Bhopals, and Chernobyls, this myth of an engineered utopia still propels the ideology of technological progress, with its perennial promises of freedom, prosperity, and release from disease and want.

Today a new, less mechanized myth has sprung from the brow of the industrial megamachine: the myth of information, of electric minds and boundless databases, computer forecasts and hypertext libraries, immersive media dreams and a planetary blip-culture woven together with global telecommunication nets. Certainly this myth still rides atop the same mechanical behemoth that lurched out of Europe's chilly bogs and conquered the globe, but for the most part, TechGnosis will focus on information technologies alone, placing them in their own, more spectral light. For of all technologies, it is the technologies of information and communication that most mold and shape the source of all mystical glimmerings: the human self.

From the moment that humans began etching grooves into ancient wizard bones to mark the cycles of the moon, the process of encoding thought and experience into a vehicle of expression has influenced the changing nature of the self. Information technology tweaks our perceptions, communicates our picture of the world to one another, and constructs remarkable and sometimes insidious forms of control over the cultural stories that shape our sense of the world. The moment we invent a significant new device for communication—talking drums, papyrus scrolls, printed books, crystal sets, computers, pagers—we partially reconstruct the self and its world, creating new opportunities (and new traps) for thought, perception, and social experience.

By their very nature, the technologies of information and communication—“media” in the broad sense of the term—are technocultural hybrids. On the one hand, they are crafted things, material mechanisms that are conceived, constructed, and exploited for gain. But media technologies are also animated by something that has nothing to do with matter or technique. More than any other invention, information technology transcends its status as a thing, simply because it allows for the incorporeal encoding and transmission of mind and meaning. In a sense, this hybridity reflects the age-old

sibling rivalry between form and content: the material and technical structure of media impose formal constraints on communication, even as the immediacy of communication continues to challenge formal limitations as it crackles from mind to mind, pushing the envelope of intelligence, art, and information flow. By creating a new interface between the self, the other, and the world beyond, media technologies become part of the self, the other, and the world beyond. They form the building blocks, and even in some sense the foundation, for what we now increasingly think of as “the social construction of reality.”

Historically, the great social constructions belong to the religious imagination: the animistic world of nature magic, the ritualized social narratives of mythology, the ethical inwardness of the “religions of the book,” and the increasingly rationalized modern institutions of faith that followed them. These various paradigms marked their notions and symbols in the world around them, using architecture, language, icons, costumes, and social ritual—and often whatever media they could get their hands on. For reasons that cannot simply be chalked up to the desire for power and conformity, the religious imagination has an irrepressible and almost desperate urge to remake the mental world humans share by communicating itself to others. From hieroglyphs to the printed book, from radio to computer networks, the spirit has found itself inside a variety of new bottles, and each new medium has become, in a variety of contradictory ways, part of the message. When the Norse god Odin swaps an eye for the gift of the runes, or when Paul of Tarsus writes in a letter that the Word of God is written in our hearts, or when New Age mediums “channel spiritual information,” the ever-shifting boundaries between media and the self are redrawn in technomystical terms.

This process continues apace, although today you often need to dig beneath the garish, commercialized, and oversaturated surface of the information age to find its archetypes and metaphysical concerns. The virtual topographies of our millennial world are rife with angels and aliens, with digital avatars and mystic Gaian minds, with utopian longings and gnostic science fictions, and with dark forebodings of apocalypse and demonic enchantment. These figures ride the expanding and contracting waves of media fads, hype, and economic activity, and some of them are already disappearing into an increasingly market-dominated information culture. But though technomystical concerns are deeply intertwined with the changing sociopolitical conditions of our rapidly globalizing civilization, their spiritual forebears are rooted in the long-ago. By invoking such old ones here, and bringing them into the discourse and contexts of contemporary technoculture, I hope to shine a light on some of the more

dangerous and unwieldy visions that charge technologies. Even more fundamentally, however, I hope my secret history can provide some imaginal maps and mystical scorecards for the metaverse that is now swallowing up so many of us, all across network earth.

You may think you are holding a conventional book, a solid and familiar chunk of infotech with chapters and endnotes and a linear argument about the mystical roots of technoculture. But that is really just a clever disguise. Once dissolved in your mindstream. Tech Gnosis will become a resonating hypertext, one whose links leap between machines and dreams, information and spirit, the dustbin of history and the alembics of the soul. Instead of “taking a stand,” TechGnosis ranges rather promiscuously across the disciplinary boundaries that usually chop up the world of thought, drawing the reader into a fluctuating play network of polarities and hidden networks. The connections it draws are many: between myth and science, transcendent intuition and technological control, the virtual worlds we imagine and the real world we cannot escape. It is a dreambook of the technological unconscious. Perhaps the most important polarity that underlies the psychological dynamics of technomysticism is a yin and yang I will name spirit and soul. By soul, I basically mean the creative imagination, that aspect of our psyches that perceives the world as an animated field of powers and images. Soul finds and loses itself in enchantment; it speaks the tongue of dream and phantasm, which should never be confused with mere fantasy. Spirit is an altogether different bird: an impersonal, incorporeal spark that seeks clarity, essence, and a blast of the absolute. Archetypal psychologist James Hillman uses the image of peaks and valleys to characterize these two very different modes of the self. He notes that the mountaintop is a veritable logo of the “spiritual” quest, a place where the religious seeker overcomes gravity in order to win a peak experience or an adamant code worthy of ruling a life. But the soul forswears such towering and otherworldly views; it remains in the mesmerizing vale of tears and desires, a fecund and polytheistic world of things and creatures, and the images and stories that things and creatures breed.

Spirit and soul twine their way throughout this book. Like the two strands of DNA, both enchanting and spiritualizing media technologies. On the one hand, we’ll see that technologies can serve as the vehicles for spells, ghosts, and animist intuitions. On the other, they can provide launching pads for transcendence, for the disembodied flights of gnosis. The different “styles” of spirit and soul can even be seen in the two basic

encoding methods that define media: analog and digital. Analog gadgets reproduce signals in continuous, variable waves of real energy, while digital devices recode information into discrete symbolic chunks. Think of the difference between vinyl LPs and music compact discs. LPs are inscribed with unbroken physical grooves that mimic and re-present the sound waves that ripple through the air. In contrast, CDs chop up (or “sample”) such waves into individual bits, encoding those digital units into tiny pits that are read and reconstructed by your stereo gear at playback. The analog world sticks to the grooves of soul—warm, undulating, worn with the pops and scratches of material history. The digital world boots up the cool matrix of the spirit: luminous, abstract, more code than corporeality. The analog soul runs on the analogies between things; the digital spirit divides the world between clay and information.

In the first chapter, I will trace the origins of these two strands of technomysticism to the ancient mythological figure of Hermes Trismegistus, a technological wizard who will inaugurate the dance between magic and invention, media and mind. Tracing this hermetic tradition into the modern world, I will discuss how the discovery of electricity sparked animist ideas and occult experiences even as it laid the groundwork for the information age. Next, I will recast the epochal birth of cybernetics and the electronic computer in a transcendental light provided by the ancient lore of Gnosticism. Then I’ll show how the spiritual counterculture of the 1960s created a liberatory and even magical relationship to media and technology, a psychedelic mode of mind-tweaking that feeds directly into today’s cyberculture. Finally, I’ll turn to our “datapocalyptic” moment and show how the UFOs, Gaian minds, New World Orders, and techno-utopias that hover above the horizon of the third millennium subliminally feed off images and compulsions deeply rooted in the spiritual imagination.

Given the delusions and disasters that religious and mystic thought courts, some may legitimately wonder whether we might not be better off just completing the critical and empirical task undertaken by Freud, Nietzsche, and your favorite scientific reductionist. The simple answer is that we cannot. Collectively, human societies can no more dodge sublime imaginings or spiritual yearnings than they can transcend the tidal pulls of eros. We are beset with a thirst for meaning and connection that centuries of skeptical philosophy, hardheaded materialism, and an increasingly nihilist culture have yet to douse, and this thirst conjures up the whole tattered carnival of contemporary religion: oily New Age gurus and Pentecostal crusaders, existential Buddhists and liberation theologians, psychedelic pagan ravers and grizzled deep ecologists. Even the cosmic awe conjured by science fiction or the outer-space

snapshots of the Hubble telescope calls forth our ever-deeper, ever-brighter possible selves.

While I certainly hope that Tech Gnosis can help strengthen the wisdom of these often inchoate yearnings, I am more interested in understanding how technomystical ideas and practices work than I am in shaking them down for their various and not inconsiderable “errors.” Sober voices will appear throughout my book like a chorus of skeptics, but my primary concern remains the spiritual imagination and how it mutates in the face of changing technologies. William Gibson’s famous quip about new technologies—that the street finds its own uses for things— applies to what many seekers call “the path” as well. As we will see throughout this book, the spiritual imagination seizes information technology for its own purposes. In this sense, technologies of communication are always, at least potentially, technologies of the sacred, simply because the ideas and experiences of the sacred have always informed human communication.

By appropriating and re-visioning communication technologies, the spiritual imagination often fashions symbols and rituals from the technical mode of communication it employs: hieroglyphs, printing press, the online database. By reimagining technologies in this way, new meanings are invested into the universe of machines, and new virtual possibilities emerge. The very ambiguity of the term information, which has made it such an infectious and irritating buzzword, has also allowed old intuitions to pop up in secular guise. Today, there is so much pressure on information—the word, the concept, the stuff itself—that it crackles with energy, drawing to itself mythologies, metaphysics, hints of arcane magic. As information expands beyond its reductive sense as a quantitative measure of meaning, groups and individuals also find room to resist and recast the dominant technological narratives of war and commerce, and to inject their fractured postmodern lives with digitally remastered forms of community, imagination, and cosmic connection.

Of course, as any number of “new paradigm” visionaries or Wired magazine cover stories prove, it’s easy to lose one’s way in the maze of hope, hype, and novelty that defines the information age. As any extraterrestrial anthropologist beaming down for a look-see would note, the computer has definitely become an idol—and a rather demanding one at that, almost as thirsty for sacrifice as the holy spirit of money itself. Since the empire of global capitalism is wagering the future of the planet on technology, we are right to distrust any myths that obscure the enormous costs of the



path we've taken. In the views of many prophets today, crying in and for the wilderness, the spiritual losses we have accrued in our haste to measure, exploit, and commodify the world are already beyond reckoning. By submitting ourselves to the ravenous and nihilistic robot of science, technology, and media culture, we have cut ourselves off from the richness of the soul and from the deeply nourishing networks of family, community, and the local land.

I deeply sympathize with these attempts to disenchant technology and to deflate the banal fantasies and pernicious hype that fuel today's digital economy. In fact, TechGnosis will hopefully provide some ammo for the debate. But as both the doomsdays of the neo-Luddites and the gleaming Tomorrowlands of the techno-utopians prove, technology embodies an image of the soul, or rather a host of images: redemptive, demonic, magical, transcendent, hypnotic, alive. We must come to grips with these images before we can creatively and consciously answer the question of technology, for that question has always been fringed with phantasms.

One thing seems clear: We cannot afford to think in the Manichean terms that often characterize the debate on new technologies. Technology is neither a devil nor an angel. But neither is it simply a "tool," a neutral extension of some rock-solid human nature. Technology is a trickster, and it has been so since the first culture hero taught the human tribe how to spin wool before he pulled it over our eyes. The trickster shows how intelligence fares in an unpredictable and chaotic world; he beckons us through the open doors of innovation and traps us in the prison of unintended consequences. And it is with a bit of the trickster's spirit— mischievous, riddling, and thoroughly cross-wired—that I shoot these media tales and technological reflections into the towering din.

— Erik Davis, *Techgnosis*, Harmony Books, 1998. Introduction: *Crossed Wires*, p. 12-20.

## There is no Algorithm, introduction by Antonio Casilli

« (...) The algorithm, on the contrary, isn't nowhere. It isn't in a exact place, isn't kept in a safe place, not even defined in an only page or an only community.

When the algorithm works properly, we don't make it out of the human decision : « I'm going from A to B, because it's my choice, not Gps's » ; « I'm gonna buy a product, because I want it and not because the adds/spams suggests me to do it. » ; « I'm gonna watch a police heroic film because I like it, and not because films about police brutality have been referenced anymore by the filtering view. »

### Il n'y a pas d'algorithme

LE LIVRE d'Olivier Ertzscheid que vous tenez entre vos mains est un chasseur qui traque deux proies : l'une est la généalogie des grandes plateformes, l'autre cet attracteur d'inquiétudes politiques connu sous le nom d'« algorithme ». Les deux thèmes de sa quête intellectuelle sont on ne peut plus différents. Le premier est par trop sur le devant de la scène, l'autre furtif.

Les grandes plateformes recherchent activement des occasions de visibilité. Leur communication luxuriante, leur *storytelling* désinhibé façonnent l'esprit du temps. Même le choix d'un acronyme pour les désigner est pléthorique : GAFA ? GAFAM ? Ou alors AFAMA (Apple, Facebook, Amazon, Microsoft et Alphabet ex-Google) ? Les plateformes numériques sont multiples parce qu'elles sont partout. L'algorithme, au contraire, n'est nulle part. Il n'est pas situé à un endroit précis, pas gardé en un lieu sûr, pas circonscrit à une seule page ou à une seule communauté.

PRÉFACE

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Quand l'algorithme fonctionne comme il faut, on ne le distingue pas de la décision humaine : « je vais me rendre d'A à B et c'est mon choix, pas celui du GPS » ; « je vais acheter un produit, parce que je le veux et non pas parce que la publicité ciblée me le suggère » ; « je vais regarder ce film de policiers héroïques parce que je l'aime bien, non pas parce que les films sur la brutalité policière ont été déréférencés par le filtrage de contenus ».

Qu'elle soit envisagée dans la littérature universitaire de référence comme un dispositif producteur d'opacité<sup>1</sup>, ou comme un jeu d'opinions et de croyances cristallisées<sup>2</sup>, ou encore comme la énième manifestation de l'idéal-type weberien de la bureaucratie impersonnelle et impénétrable<sup>3</sup>, une entité algorithmique est surtout un simulacre. En la poursuivant, chacun se trompe.

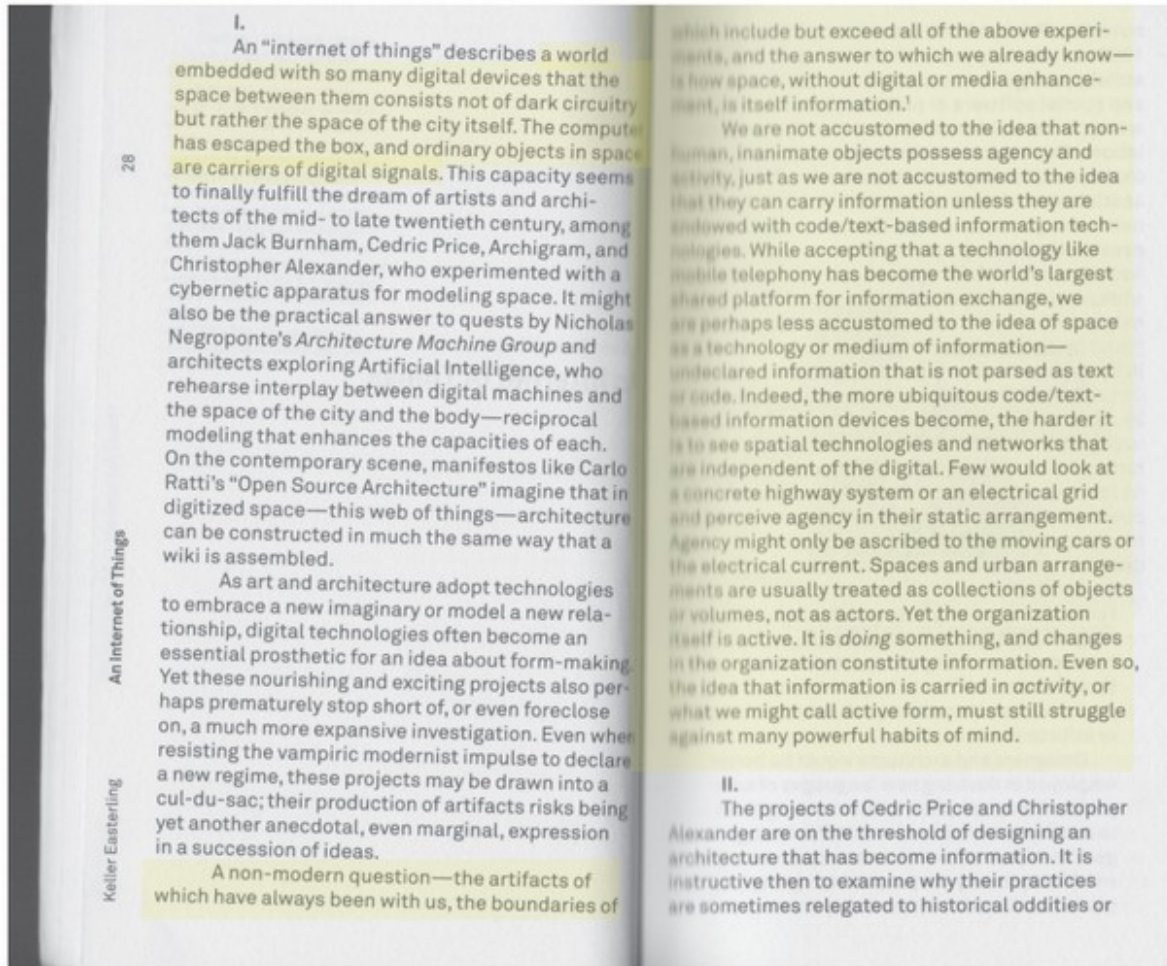
La deuxième proie d'Olivier Ertzscheid est l'ombre même. Ainsi, pour être certain d'en saisir les traits distinctifs, l'auteur se doit de multiplier les prises de vue en adoptant un double regard, de chercheur et de blogueur militant. Ni florilège ni abrégé, son ouvrage constitue, par rapport au blog *affordance.info* qu'il anime avec succès depuis plus d'une décennie, une sorte de propriété émergente – une synthèse qui offre davantage que la somme des billets. L'arbitrage qui a régi la logique de composition et le passage du site web au livre, fournit aux lecteurs un outil analytique

1 *The Black Box Society, les algorithmes secrets qui contrôlent l'économie et l'information*, Frank Pasquale, FYP Éditions, 2015.

2 *Weapons of Math Destruction. How Big Data Increases Inequality and Threatens Democracy*, Cathy O'Neil, Crown Publishing, 2016.

3 « Rule by Nobody. Algorithms update bureaucracy's long-standing strategy for evasion », Adam Clair, *Real Life Magazine*, 21 février 2017.

12



Some articles on the Net about immateriality

<http://internetactu.blog.lemonde.fr/2016/03/19/technologies-la-perte-de-contexte-est-une-perte-de-controle/>

<http://www.rethinkingmatter.com/blog/2017/3/27/what-is-digital-materiality>

Antonio Casilli, There is no Algorithm



## **Algorithms and their others**

In computer science terms, an algorithm is an abstract, formalized description of a computational procedure. Algorithms fall into different types according to their properties or domains - combinatorial algorithms deal with counting and enumeration, numerical algorithms produce numerical (rather than symbolic) answers to equational problem, while probabilistic algorithms produce results within particular bounds of certainty.

Algorithms may also vary in terms of their analytic characteristics, such as generalized performance characteristics (e.g. how their mean-time or best-time performance varies with the size of the data sets over which they operate). As part of the stock-in-trade of computer scientists and software engineers, some algorithms are known by the names of their inventors (Dijkstra's algorithm, the Viterbi algorithm, Gouraud shading, or Rivest-Shamir-Adelman) while others are known by conventional names (e.g. QuickSort, Fast Fourier Transform, Soundex, or sort-merge join).

The significance of some of these properties - formalization, abstraction, identity, and so on - becomes clearer when we look at algorithms in the context of their "others" - related but distinct phenomena that emphasize different aspects of the sociotechnical assembly. In speaking of what an algorithm "is" and "is not," I am not asserting its stable technical identity; rather, my motive is to be ethnographically true to a members' term and members' practice. As such, then, the limits of the term algorithm are determined by social engagements rather than by technological or material constraints. While social understandings and practices evolve, algorithm, as a term of technical art, nonetheless displays for members some precision and a meaning within a space of alternatives. When technical people get together, the person who says, "I do algorithms" is making a different statement than the person who says, "I study software engineering" or the one who says, "I'm a data scientist," and the nature of these differences matters to any understanding of the relationship between data, algorithms, and society.

Accordingly, an investigation of the particular territory staked out by the term "algorithm", in among other related terms and phenomena, seems worthwhile, especially if the algorithm is presented as a site of particularly valuable leverage in contemporary debates. With that caution in mind, then, we can consider the work that the term "algorithm" does and might do for social analysis contextually.

## **Algorithm and automation**

Perhaps the most diffuse concern expressed by discussion of algorithms is that which uses the notion metonymically to address the regime of digital automation most broadly. Here, the concern is not with algorithms as such, but with a system of digital control and management achieved through sensing, large-scale data storage, and algorithmic processing within a legal, commercial, or industrial framework that lends it authority.

We might point here to discussions of credit scoring (e.g. Zarsky, 2016), digitally enhanced public surveillance (e.g. Graham and Wood, 2003), or plagiarism detection (e.g. Introna, 2016) as cases where concerns with the algorithmic, in part or in whole, stand in for critiques of the larger regime of computer-based monitoring and control. To be sure, crucial issues of labor politics, social justice, personal privacy, public accountability, and democratic participation are thrown up by this technologically enabled system of management, and the expansion of the sorts of regulative, coercive, and divisive processes that are the legacy of Charles Babbage and Frederick Taylor, and algorithms play a critical role in these. Indeed, these are among the most important areas of political analysis that an understanding of “algorithm” as a term of technical art and practice can illuminate. Nonetheless, the wholesale equation of algorithm and automation makes this work more, rather than less, difficult. If we want to be able to speak of algorithms analytically in order to identify their significance as specific technical and discursive formulations then we need to be able to better identify how they operate as part of, but not as all of the larger framework.

## **Algorithm and code**

At a greater level of specificity, we might consider the distinctions to be drawn between algorithms and code. In various forms, code has been a particular focus of attention in software studies, acting as it does as a site of material, textual, and representational production.

Code is software-as-text, and particularly in the form of “source code,” the human-readable expressions of program behavior that are the primary focus of programmers’ productive attentions, it has perhaps been particular by those working under the umbrella of “critical code studies” (see, e.g., Berry, 2011; Montford et al., 2012). In textbooks and research papers, algorithms are often expressed in what is informally called “pseudocode,” a textual pastiche of conventional programming languages that embodies general ideas that most languages share without committing to the syntactic or semantic particulars of any one. Pseudo-code expresses the abstract

generality of an algorithm, the idea that it can be operationalized in any programming language while transcending the particulars of each. It also expresses the promise of an algorithm, the idea that it is code-waiting-to-happen, ready to be deployed and brought to life in programs yet to be written (Introna, 2016). The idea that the relationship between the algorithm and the code is largely a temporal one is perhaps, then, not surprising, and yet there are distinctions that have a good deal of significance from an analytic perspective. I will outline four here.

First, while the transformation of an algorithm (described in mathematical terms or in pseudo-code) into code may be relatively straight-forward (although it is not necessarily so), the reverse process – to read the algorithm off the code – is not at all a simple process. There are a number of circumstances in which this need arises.

Assessing whether an algorithm has been correctly implemented by a piece of code, for example, is one case of attempting to “read off” the algorithm (as implemented) from the code, and the complexity of this is made clear by the many cases in which errors slip through. Within the domain of Internet security, for example, there have been a number of headline cases lately where trusted code did not in fact correctly implement the algorithm that it was meant to embody, leaving systems open for attack and data breaches; the “Heartbleed” incident is among the best known (Durumeric et al., 2014). The difficulty of reading an algorithm off the code also lies at the heart of patent disputes (over whether a given piece of code does or does not implement a protected algorithm, for instance) as well as simply cropping up as a practical problem for a programmer charged with understanding, maintaining, modifying, or porting an existing software system written by another (or sometimes even the code we wrote ourselves).

Second, algorithms and code have different locality properties. One of the reasons, in fact, that the algorithm may not be easy to read off the code is that the algorithm may not happen all in one place. The algorithm, an apparently singular object when it appears on the page of a book, becomes many different snippets of code distributed through a large program. Even if they happen in sequence when a program is executed, they may not occur together or even nearby within the text of a program. In a program, they may be intermixed with elements of other algorithms, or they might simply be distributed between different modules, different methods, or different functions, so that they operate of the algorithm is (intentionally or unintentionally) obscured.

Third, algorithms are manifest differently on different code platforms. Object-oriented languages, procedural languages, functional languages, and declarative languages are all based on different paradigms for code expression and so will express the same

algorithm quite differently. Particular examples of those language styles have different features and different sets of libraries, and will be able to rely on those in different ways to carry out some of the algorithm's operations.

Different computer architectures, different data storage technologies, different arrangements of memory hierarchy, and other features of a platform mean that the code of an algorithm is highly variable and highly specific. The "governing dynamics" of algorithms (Ananny, 2016), then, are only in part algorithmic; they are as much platform effects.

The fourth observation is something of a corollary to the others, although one with particular consequences. One reason that an algorithm can be hard to recover from a program is that there is a lot in a program that is not "the algorithm" (or "an algorithm"). The residue is machinic, for sure; it is procedural, it involves the stepwise execution of one instruction followed by another, and it follows all the rules of layout, control flow, state manipulation, and access rights that shape any piece of code. But much of it is not actually part of the - or any - algorithm. An algorithm might express, for example, how to transform one kind of data representation into another, or how to reach a numerical result for a formula, or how to transform data so that a particular constraint will hold (e.g. to sort numbers) - but actual programs that implement these algorithms need to do a lot more besides. They read files from disks, they connect to network servers, they check for error conditions, they respond to a user interrupting a process, they flash signals on the screen and play beeps, they shuffle data between different storage units, they record their progress in log files, they check for the size of a screen or the free space on a disk, and many other things besides. An algorithm may express the core of what a program is meant to do, but that core is surrounded by a vast penumbra of ancillary operations that are also a program's responsibility and also manifest themselves in the program's code. In other words, while everything that a program does and that code expresses is algorithmic in the sense that it is specified in advance by formalization, it is not algorithm, in the sense that it goes beyond things that algorithms express, or even what the term "algorithm" signals as a term of professional practice.

**Paul Dourish. Algorithms and their others: Algorithmic culture in context.**

<https://journals.sagepub.com/doi/10.1177/2053951716665128>



What is computation? This question lies at the core of computer science. This chapter provides an answer—at least a tentative one—and connects the notion of computation to some closely related concepts. In particular, I explain the relationship between computation and the concepts of problem solving and algorithms. To this end, I describe two complementary aspects of computation: what it does, and what it is. The first view, computation solves problems, emphasizes that a problem can be solved through computation once it is suitably represented and broken down into subproblems. It not only reflects the tremendous impact computer science has had in so many different areas of society but also explains why computation is an essential part of all kinds of human activities, independent of the use of computing machines. However, the problem-solving perspective leaves out some important aspects of computation. A closer look at the differences between computation and problem solving leads to a second view, computation is algorithm execution. An algorithm is a precise description of computation and makes it possible to automate and analyze computation. This view portrays computation as a process consisting of several steps, which helps explain how and why it is so effective in solving problems. The key to harnessing computation lies in grouping similar problems into one class and designing an algorithm that solves each problem in that class. This makes an algorithm similar to a skill. A skill such as baking a cake or repairing a car can be invoked at different times and thus can be employed repeatedly to solve different instances of a particular problem class. Skills can also be taught to and shared with others, which gives them an even wider impact. Similarly, we can execute an algorithm repeatedly for different problem instances and generate with each execution a computation that solves the problem at hand.

### **Dividing Problems into Triviality**

Let us start with the first perspective and consider computation as a process that solves a specific problem. As an example, I use the well-known story of Hansel and Gretel, who were left to die in the woods by their parents. Let's examine Hansel's clever idea that allowed him and Gretel to find their way back home after being left behind in the forest. The story unfolds in the context of a famine, when Hansel and Gretel's stepmother urges their father to lead the children into the forest and abandon them, so that the parents can survive. Having overheard his parents' conversation, Hansel goes outside later that night and collects several handfuls of small pebbles that he stuffs into his pockets. The next day, during their walk into the forest, he drops the pebbles along the way as markers for the way back home. After the parents have left



them, the children wait until it is dark and the pebbles begin to shine in the moonlight. They then follow the pebbles until they return home.

The story doesn't end here, but this part provides us with a peculiar example of how a problem is solved using computation. The problem to be solved is one of survival—certainly much more serious than the problem of getting up. The survival problem presents itself as a task of moving from a location in the forest to the location of Hansel and Gretel's home. This is a nontrivial problem particularly because it cannot be solved in one step. A problem that is too complex to be solved in one step has to be broken down into subproblems that are easy to solve and whose solutions can be combined into a solution for the overall problem.

The problem of finding the way out of the forest can be decomposed by identifying a sequence of intermediate locations that are close enough to each other that one can easily move between them. These locations form a path out of the forest back to Hansel and Gretel's home, and the individual movements from one location to the next are easy to achieve. When combined, they yield a movement from the starting location in the forest to the home. This movement solves Hansel and Gretel's problem of survival in a systematic way. Systematic problem solving is one key characteristic of computation. As this example illustrates, a computation usually consists of not just one but many steps. Each of these steps solves a subproblem and changes the problem situation a little bit. For example, each move by Hansel and Gretel to the next pebble is a step in the computation that changes their position in the forest, which corresponds to solving the subproblem of reaching the next target on the path home. While in most cases each individual step will bring the computation closer to the solution, this does not necessarily have to be the case for every step. Only all steps taken together have to yield the solution. In the story, while each position that Hansel and Gretel go through will generally be closer to home, it is also likely that the path is not a straight line. Some pebbles may even cause detours, for example, to move around obstacles or to cross a river using a bridge, but this does not change the effect of the combined movement.

The important lesson is that a solution is obtained through a systematic problem decomposition. While decomposition is a key strategy to obtaining a solution to a problem, it is not always sufficient by itself, and solutions may depend on supplementary items—in the case of Hansel and Gretel, the pebbles.

### **No Computation without Representation**

If a computation consists of a number of steps, what does each of these steps actually do, and how can all the steps together produce a solution to the given problem? To

produce an aggregate effect, each step has to have an effect that the next steps can build on so that the cumulative effect produced by all the steps results in a solution for the problem.

In the story the effect of each step is to change Hansel and Gretel's location, and the problem is solved when the location is finally changed to their home. In general, a step in a computation can have an effect on almost anything, be it concrete physical objects or abstract mathematical entities.

To solve a problem it is necessary that a computation manipulate a representation of something meaningful in the real world. Hansel and Gretel's locations represent one of two possible states: all locations in the forest represent the problem state of danger and possibly death, while their home represents the solution state of safety and survival. This is why the computation that brings Hansel and Gretel home solves a problem—it moves them from danger to safety. In contrast, a computation that leads from one place in the forest to another would not achieve that.

— **Martin Erwig. Once Upon an Algorithm. MIT Press. 2017.**



What I'm doing with my life is building a set of generalizations comprehending how time works. I call the comprehension of the time laws of any process "chronetics". I've been working at it a "long" time and have done it in some strange places. Like, a dissertation on Plato's theory of time, which started in '58 but didn't come till '63. Like, in '65 getting a videotape system installed in a family therapy agency so families and therapists could play back their sessions during their sessions. Like getting headaches trying to transform the laws of general relativity into classroom sociology since 1953, though I hate the math. Like trying to figure out acid time expansion during acid time expansion. Etc . This rap is about the chronetics of software, in other words, some thoughts on the time forms of current communication events.

(...)

A question which bothers everybody in software—Will enough of us get our hands on enough hardware to produce enough software to sustain a new (global) culture in time? That is, can we do it well enough fast enough? The first half of this question involves ecological recycling—there's an awful lot of good information around which we could share better if only those maverick data banks were set up. After all, it's chronetically silly to shoot tape at light speed then air mail it to friends in London. And, since they own the satellites, all they have to do is charge prohibitive rentals so we can't move our information as fast as we shoot it. So far. They are not gonna rent us time to create alternatives to them.

So, it seems to me, we are going to have to come up with software which is not only good for us but good for them too. That's what global means. We have no choice but to take them with us-i.e., turn them on to the benefits of our way. We're gonna have to go beyond the hip ethnocentrism we built to defend ourselves against them. We can't any longer enjoy being so "far out" that nothing happens. This could turn out to be a fatal underload.

The only choice we have, in my opinion, is to produce software which mediates their (slower) frequencies and our (faster) ones into those which harmonize both of us with the (much faster) vibes of a really global synchronous system. To put it crudely, we have to show the satellite-computer people how our way is better for all of us, that a planetary form is better-for all of us-than a cartel.

I guess my own naturalism is unmasked in the following optimistic statement-somehow the people always recognize a masterpiece, so that's what we have to do. Which is not, in the strict sense, a political, but rather a cultural-aesthetic task.

The dilemma-you can't have a revolution unless your head's together-but you can't get your head together unless you have a revolution-here arises. I'm suggesting that both tasks-solidarity and revolution-are facilitated by broadening the collective imagination with such questions as : What is that process of which industrialism, then automation, then cybernation are the acceleratively appearing moments? What are the unknown time rules such processes follow? Can we design other frequencies and forms?

I think so. But, as Fuller says - "This means things are going to move fast".

### **— Vic Gioscia, Frequency and Form**

[http://www.radicalsoftware.org/volume1nr2/pdf/VOLUME1NR2\\_0009.pdf](http://www.radicalsoftware.org/volume1nr2/pdf/VOLUME1NR2_0009.pdf)

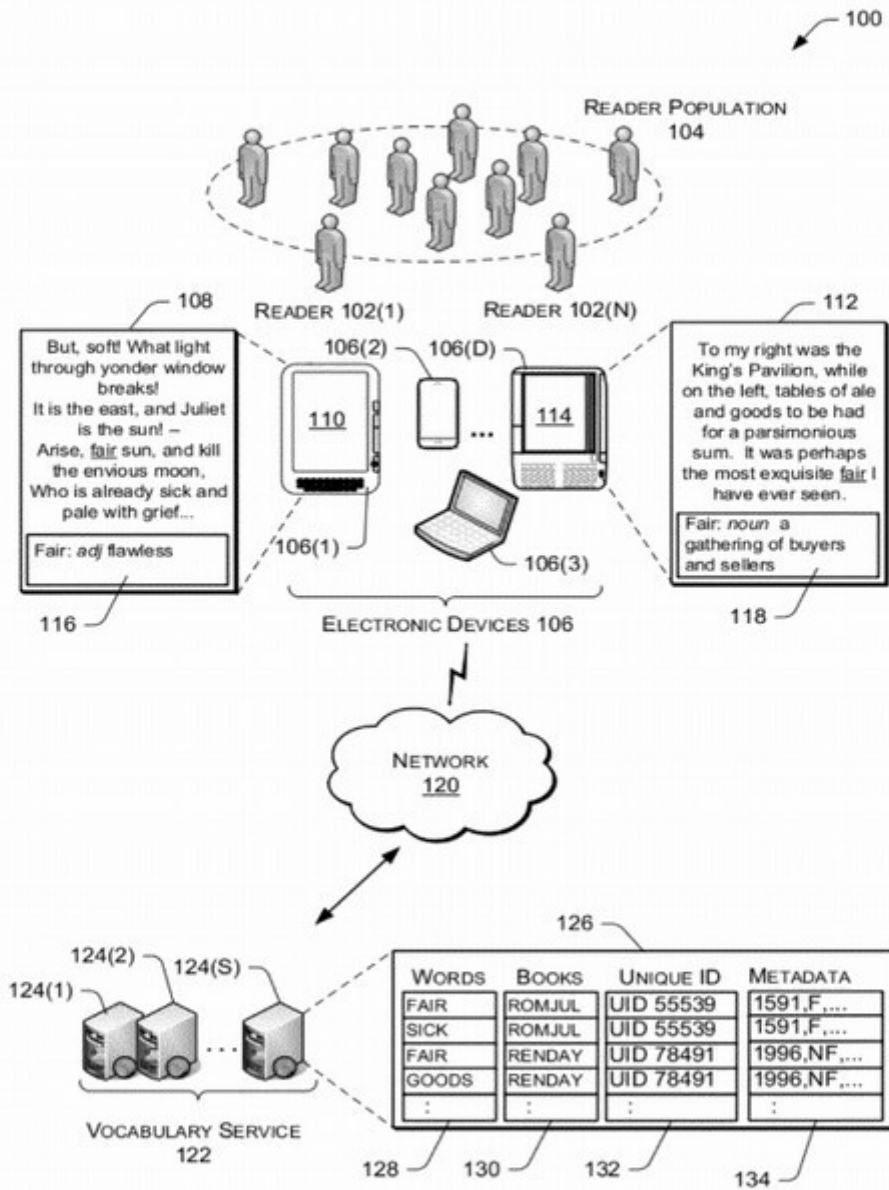


Fig. 1

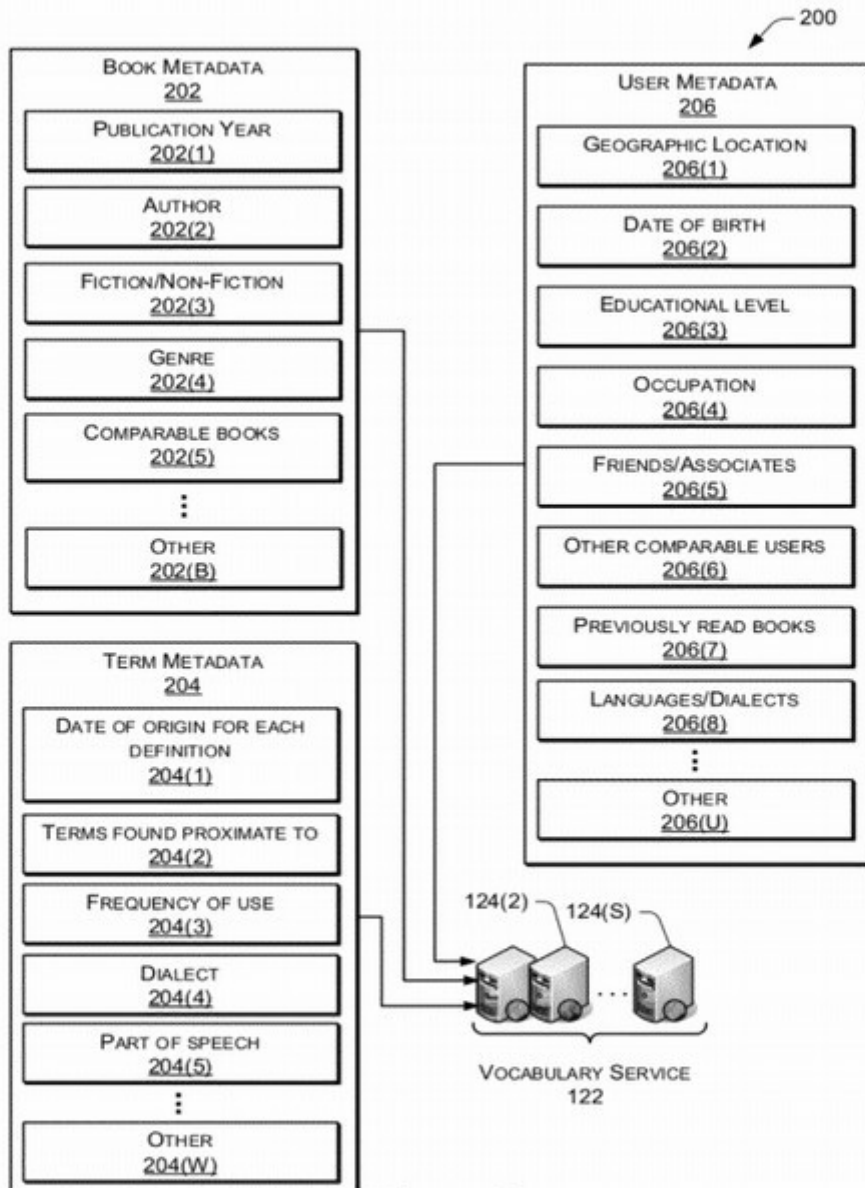


Fig. 2

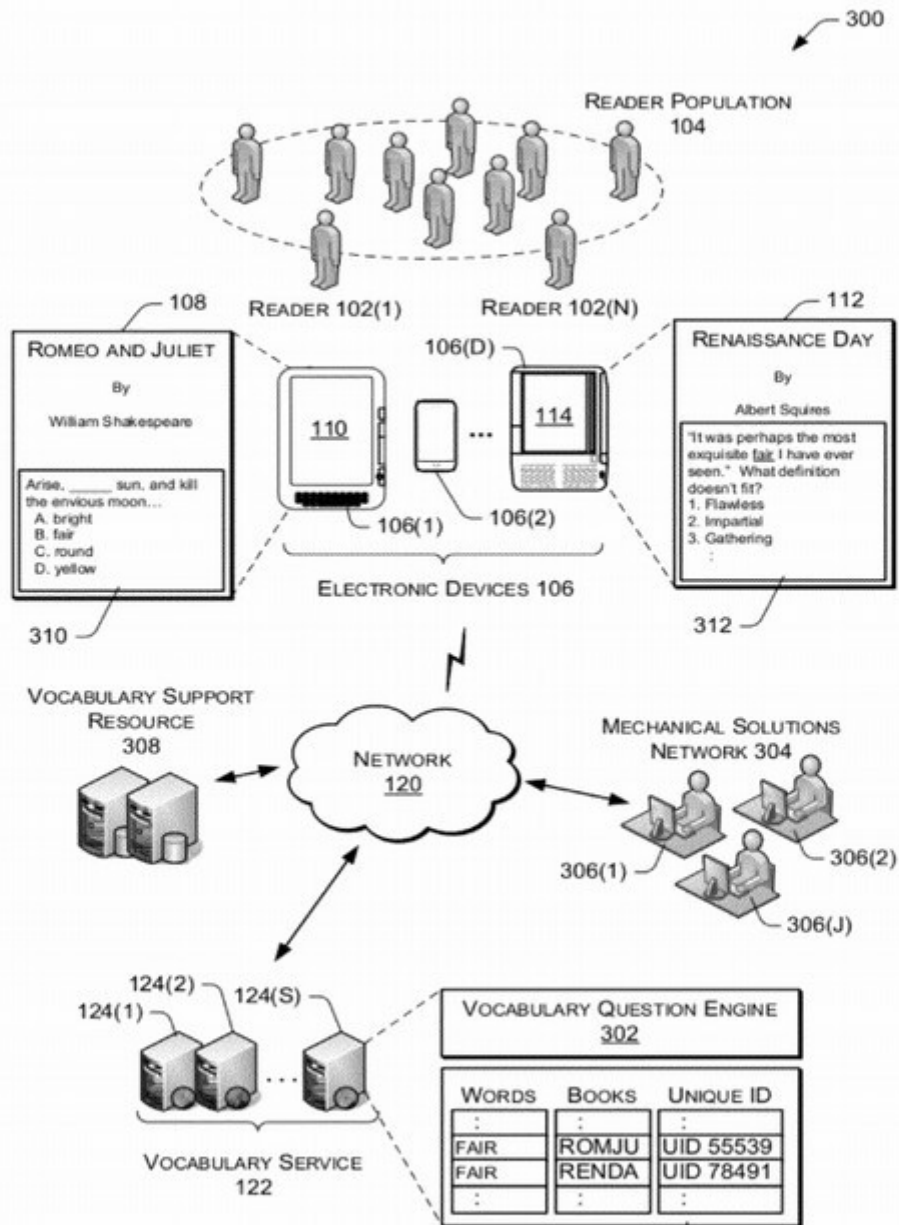


Fig. 3

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## O

The anarchieve is best defined for the purposes of the Immediations project as a repertory of traces of collaborative research-creation events. The traces are not inert, but are carriers of potential. They are reactivatable, and their reactivation helps trigger a new event which continues the creative process from which they came, but in a new iteration.

Thus the anarchieve is not documentation of a past activity. Rather, it is a feed-forward mechanism for lines of creative process, under continuing variation.

The anarchieve needs documentation – the archive – from which to depart and through which to pass. It is an excess energy of the archive: a kind of supplement or surplus-value of the archive.

Its supplemental, excessive nature means that it is never contained in any particular archive or documentation element contained in an archive. It is never contained in an object. The anarchieve is made of the formative movements going into and coming out of the archive, for which the objects contained in the archive serve as springboards.

The anarchieve as such is made of formative tendencies; compositional forces seeking a new taking-form; lures for further process. Archives are their waystations.

Since it exceeds the archive and is uncontainable in any single object or collection of objects, the anarchieve is by nature a cross-platform phenomenon. It is activated in the relays: between media, between verbal and material expressions, between digital and off-line archivings, and most of all between all of the various archival forms it may take and the live, collaborative interactions that reactivate the anarchival traces, and in turn create new ones.

The anarchieve pertains to the event. It is a kind of event derivative, or surplus-value of the event. This makes it an essential element of the Immediations project, whose stated aim has been to develop an approach to research-creation as a practice of interdisciplinary event design, or to quote the original application, as the practice of creating innovative “platforms for organizing and orienting live, collaborative encounters.”

Approached anarchivally, the product of research-creation is process. The anarchieve is a technique for making research-creation a process-making engine. Many products are produced, but they are not the product. They are the visible indexing of the process’s repeated taking-effect: they embody its traces (thus bringing us full circle to point 1)

— Annie Abrahams. **Anarchieve – Concise Definition**



**Josh Davis**  
@Obby\_Oss

Suivre 

4YO daughter asks my @Google Mini: "Hey Google, what's Mrs. Claus doing?"

Google proceeds to find an article about Mrs. Claus & explain that Mrs. Claus & Santa are made up stories.

Thanks Google.

[#MerryChristmas](#) [#Christmas](#) [#AI](#) [#AiFail](#)

 À l'origine en anglais

18:50 · 24 déc. 2017

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## O

"Alchemical worldview as a proto-cybernetic thinking: on the first feedback loop control system, invented by lesser-known and "non-savant" alchemist Cornelis Drebbel. The alchemical oven, the Athanor, embodied a lot of elements of the alchemical worldview and prefigures cybernetic conceptions of systems and control. But it is informed by a much more animistic conception of nature! Something to consider, beyond the parallels of hermetic encrypting of recipes and modern programming."

Excerpt:

"By the time Cornelis Drebbel built an oven with a simple thermostat, one of the first manmade feedback mechanisms in history, in the 1620s, he was regarded in Europe as a magisterial, if not mad, inventor.[...]

One modern scholar says Shakespeare used Drebbel as a model for Prospero, his noble sorcerer, who rules the mysterious island in *The Tempest*.[...]

That's remarkable about Drebbel today, other than the fact the bewitching Dutch genius is so little known, is how much he has to teach us about the birth and progress of science. He built his oven at a time when a "vital" worldview, in which inanimate objects contain living energy, forged a prelude to the mechanical age.[...]

"Drebbel's circulating oven," as historians of science now call it, included an early thermometer with a heat scale. It regulated itself with a feedback-control device that is a progenitor of the ubiquitous systems that regulate the air we breathe in homes, offices, trains, planes, and automobiles. His oven is one of the earliest devices that gave human control away to a machine and thus can be seen as a forerunner of the smart machine, the self-deciding automaton, the thinking robot...Drebbel's achievement was astonishing: Informed by a piece of ancient plumbing, he invented an iconic first feedback device. His thermostat provided a seminal example for feedback-control devices of the 18th century, when inventors came up with all manner of float valves, pressure regulators, and centrifugal governors to manage steam engines. Today, feedback loops and automatic control are greatly amplified by the recursive power of digital logic and computers.[...]

Bert Hall, a retired historian of technology at the University of Toronto, compares Drebbel to Isaac Newton. "Alchemical types of the period like Newton—the great magus—want everything to make sense; they want absolutes," Hall says. "There can't be anything extraneous. That's one of the differences between pre-modern and modern thinking." "As Above, So Below," summarizes the alchemical belief that

everything in the macrocosm of the universe is related to everything in the microcosm of humanity. This was the philosophy that guided Drebbel as he forged his furnace. [...] It's an ironic tale because Drebbel's oven also embodies a vitalist spiritual philosophy. He was a master craftsman, but strictly mechanical inventions weren't his goal. Drebbel always claimed to have drawn his wisdom from nature, declaring that he never read Latin or the classical authors, or enriched his writing with ancient wisdom. He regarded inventions like his oven as public demonstrations of the elemental forces of nature—earth, water, air, fire.[...]

— **Steven Ashley, The Vulgar Mechanic and His Magical Oven**

<http://nautil.us/issue/20/creativity/the-vulgar-mechanic-and-his-magical-oven-rp>



## SPIRITS



K: When I was a kid I always saw things. I saw creatures and spirits and all of that. I would say until I was about 11 years old. By then, I was told that wasn't what you were supposed to look for. I spent a lot of time as a child looking out the window and seeing things. I think that is why I love gardening so much, because you can be in touch with those kinds of influences and not be thought crazy. You can commune with the varying energies and feel good about it.

The most profound experience that I had, was when I stopped drinking decades ago, I was very much aware of help from the other side. The way that it came about, was really interesting. I decided to stop drinking on the 17<sup>th</sup> December and Frank and I had never taken a honeymoon. We decided during that time that we would go to the big island of Hawaii. At the time, I had a friend who was training as a hypnotherapist. She had come across in some of the groups that she had done, the work of a Hawaiian healer, by the name of Papa Henry Auwae (1907-2001). She said, if you're going to Hawaii, you need to see Papa Auwae, he's really a healer. I thought, great, ok. But Frank immediately picked up on it. He called Papa Auwae and made an appointment. We drove all the way across the big island to Hilo where Papa Auwae lived in a wooden house painted dark red. He was about 85 years old. We come in the back door. He takes us into a kind of a sitting room. We're sitting on chairs. He starts asking me about how long and what's going on. I don't remember everything he asked me nor do I remember everything that he told me, but I remember his eyes. Basically, his instruction to me was, you take these herbs and you put them in tea, everyday at the same time and so on and so forth. He said: it will not be easy. I said that I knew that. That was the end of that, except to say that, that was the beginning of the support that I felt for the change. I knew that it was going to happen and I knew that it was going to last, even though I had my moments of craving. I knew that this was once and for all.

Years later, I got a copy of Parabola - an esoteric publication in US. This was some time after Papa Auwae died. There was an article on him and his life work. I discovered then that he was the great Kuhuna of all the Hawaiian islands. He was the great shaman, in charge of the rituals at the City of Refuge. There I had first gone as part of my

pelgrimage on the island of Hawai to be initiated in reiki. I felt that that was a huge influence in my life. Also the fact that three years leading up to this point, I had been in the company of native americans, because part of my work for a corporation, was to maintain relationships with all the native american tribes working with native american youth to help and encourage them in careers in technology. I was meeting with elders, learning native american ways, hanging out with all of the tribal stories, learning all of this. One day, I was sitting at a lunch next to a native american. He was a Cherokee. He said, I never had anything in my life, until I quit drinking. Now I have my dignity.

That was like an arrow pierced my heart. Ah! That's what it is. And then the story of Papa Auwae came.

A: If you say that you felt the support, can you try to visualise it?

K: No, it was a felt thing. I remember saying in AA-meetings - people often think you're crazy when you first sober up - that there is help from the other side. I feel like there are angels watching over us, I said. That we're being taken care of if we allow it.

A: Did you feel it physically?

K: Yes, I felt it as something around my head. I just always felt a presence or presences. And I trusted that. Maybe I graduated from when I was younger of seeing to feeling.

A: When you were a kid, you could see them. Can you give an example of what you saw?

K: No, because it is difficult to identify. I just always felt at home. I didn't feel threatened. I didn't feel afraid. But in the night, I'd tell my father that I saw something go down the hall, he'd get up and go down the hall, he'd come back and say: no, nothing there.

I could see entities, beings. Whether they were bodies, it was less definable than that. Shapes, some colours. I'm not so sure that most children don't see something like that. Or that they can see something around people or read auras. I was able to do that at different times in my life. I could see darkness in certain auras and light in others, and wondering what that was. At the time I was not really understanding that it was something. I had a vague sense that something was going on.

It's not something that I rely on as a profession. I think all people are capable of doing it and do read from one degree or another. I guess it's just information. I think the spirit world, the invisible world, is with us, and that the veil between the visible and

the invisible is very thin. We think that death is a big door that is separating us, but I don't think that is so. I think quantum physics is telling us, one minute you're on one side and the next minute you're on the next, whoever you are. Maybe.

A: So, spirits are material?

K: Yeah, because I suppose that if you say the absolute is the immaterial, then yes, I suppose there are gradations between what is densely material and what is less densely material. Rocks and this chair I'm sitting in, that's one kind of physical reality. And then, what would you say to felt presences? They're not seen necessarily or maybe they are seen but they're ephemeral. They're not solid.

An: Like gas?

K: Yeah, or less than gas.

**— Interview with Kathy Melcher by An Mertens at Bois-Le-Comte, June 2018.**

Kathy works as a psycho-therapist. Together with her husband Frank Coppieters they organise shamanic trainings for 30 years. <http://livinglightcenter.com/>



"Laikas lived free from a European belief system about predators and prey, the loss of paradise, and the fall from grace. After the Conquest, many indigenous peoples of the Americas began to see themselves as stuck in a web of inevitable suffering. Yet after their initiation, they no longer felt the need to bemoan their fate or point a finger of blame upward at the gods or around them at their oppressors. They recognized that we inevitably experience tribulations, including such major ones as enslavement and the loss of culture. However, they also knew that we can orchestrate a different reality the moment we understand that cosmic order is conducting the symphony of creation, and we are playing an indispensable instrument as we make music with the heavens. Initiation allowed them to align themselves with that order to manifest harmony in their lives, in spite of oppressive outer circumstances.

A shaman learned that responding to pain by looking around for the responsible party in order to exact revenge or demand justice simply caused more agony for everyone. He didn't waste precious energy perpetually contemplating the nature of his wounds or brandishing a sword at the shadows surrounding him. Instead, he spotted the wound, recognized its source, attended to healing himself, and stayed alert to the danger of slipping back into the realm of predator and prey. He did this by shedding the story of the Conquest that once defined him and all his "problems," and by discovering the fresh new skin that lay underneath the old. Each morning, he renewed himself when he looked at his reflection in the lake."

— **Alberto Villoldo. *Illumination*. Hay House Publishing, USA, 2010.**

## ANCESTORFUTURISM FREE COSMOGONY – “D.I.Y. RITUALS”

By Fabiane M. Borges  
Translated by João de Deus

### Non-Human communities of specters

In order to complexify this matter, when we talk about communities of specters we should avoid the previously mentioned anthropocentrism, so these communities are not thought departing from an immaterial paradigm or a product of human imagination alone. The idea here is exactly to remove the “human” from the center of the world, so it becomes possible to understand specters produced by non-human imaginaries, for we live in a living planet, which produces spectral networks and is inserted in a cosmos that is both living and spectral.

The “Amerindian Perspectivism” of Eduardo Viveiro de Castro(15) helps us to understand the nature of these non-human specters’. When he mentions Amerindian animism, he points towards the presence of what can be understood as communities of specters. For example qualifying the shaman as an interspecies diplomat who establishes relations with the spirit of the water, of the tree, of the bees, of the jaguar, or mentioning the shaman’s embodiment into other species’ bodies or vice versa. In “The Falling Sky”(16), Davi Kopenawa confirms this idea when he gives an account of his shamanic initiation, his relationship with the xapiris who pre-existed their own existence, calling them the ancestors’ xapiris. In one scene he describes how the xapiris left his body after they initiated him:

“Later the xapiri came to reassemble the segments of my body, which they had dismembered. They set my head and my chest in the place of my lower body and my lower body became my arms and my head. It’s true! They reversed my body, placing my ass where once was my face, and mouth is in the place of my anus! Then, at the glued joining of the two parts of my body, they set a broad belt of colorful feathers “Heima si” and “wisawisama si.” They replaced my entrails with those possessed by spirits: smaller, bright white, carefully wrapped on themselves and covered with light and soft down. Then they replaced my tongue with one they had constructed and set it in my mouth with teeth as beautiful as theirs, colored like the plumage of birds – it was like this – They also replaced my throat with a tube, we call it “purunaki” – so that I can continue to learn their songs with skill and speak with clarity. This tube is the larynx of the spirits. It is there they hold the breath of their voice. This is a door through which our words can emerge – beautiful and direct.”

This description seems to demonstrate that after initiation, a witchdoctor — a pajé — will never again be the owner of his body, in order to be a “diplomat” between species, it is necessary to possess a body devoid of its individuality so as to become a vessel for multi-species’ specters. In that sense Ludueña says that in order to think about spectrology it is also necessary to think about what pre-exists us as humanity and what will survive us. He is not exactly talking about God Jehovah the creator, or a metaphysic compromised with either a certain monotheism or polytheism, but about spectrology as an act of population, as multiplied humanized and non-humanized gazes that witness the passage of humanity on Earth. Not only might we be seen by those non-human specters, but going even further we ourselves can also be specters created by some sort of nonhuman community.

Applied to ancestorfuturism, this understanding should work more as a profound exercise of rupture with anthropocentrism than a religious precept or a foundation of doctrinal faith. As an exercise, it is valid to activate an imaginary generator, to intensify the feelings, to empower the effects and to validate non-factual but subjective and felt experiences. To dignify and expand the scope of what is understood as reality. A de-anthropocentric exercise must take into account non-factual relations, invest in the creation of spectral connections, or at least dignify fictional narratives. Potentially bringing a new conceptual and experimental source of how to think about and relate to madness, for example. There are also implications of an expanded subjectivity, less manipulatable by taming systems, which grow overwhelmingly at the same time that exponential technologies are developed.

#### Ancestorfuturism

When we discuss ancestorfuturism it is important to take into account the following facts: 1) the specters’ community is composed of human fictions that can be actualized into reality with hyperstitional resources; 2) the specters’ community can be constituted of non-human fictions’ actualizations; 3) earth, as a part of a cosmic movement can absorb non-human and non terrestrial specters that pre-exist humanity and can survive it; 4) the animistic Amerindian universe is not reduced to a earthly animism, but expanded to a universal and cosmic one, and operates with multispectral incorporation and possession; 5) hyperstition is a device of actualization of human and non-human spectral communities; 6) ancestorfuturism is a navigator that actualizes different temporalities between the ancestral and the future in a single time, actualizing the human and nonhuman spectral communities, terrestrial and non-terrestrial, existing and not yet existing, which are created by fictional convergences and materialize themselves through hyperstitional devices in the present directly interfering on the past and future in a non-linear way; 7) ancestorfuturism is a speculative fabulation (fiction) committed to potentiate imaginary generators and to expand the spaces for affect, sensation and experience,



in order to attribute them dignity, so that this cooperates in the creation of other humans and other worlds, in a moment when the planet itself goes through structural changes.

To repeat a previous point: ancestorfuturism uses devices such as hyperstition and creation of spectral communities in order to build its own organizational plane. It is departing from this point that the immersive experiences proposed in the do-it-yourself rituals are build upon, which have as a goal the production of a sensation of belonging (*communitas*), to generate a space/time of creative production (of free cosmogonies and mythologies — even if remixed with traditional ones) and to potentiate and dignify the experience (incentivizing new becomings, affects and perceptions.) Simultaneously, ancestorfuturism strays from theological, cosmological and religious traditions currently operating in our society; it demystifies their statuses as truths, it plays ancestry towards spectrality, and the future towards speculative fiction, with the power to actualize itself.

15Eduardo Viveiros de Castro - *Cannibal Metaphysics* - Ed. Univocal Publishing Minneapolis 2014.

16The Falling Sky - *Words of a Yanomami Shaman* - Davi Kopenawa and Bruce Albert - Harvard University Press - 2013

## O

*I etch a pattern of geometric shapes onto a stone. To the uninitiated, the shapes look mysterious and complex, but I know that when arranged correctly they will give the stone a special power, enabling it to respond to incantations in a language no human being has ever spoken. I will ask the stone questions in this language, and it will answer by showing me a vision: a world created by my spell, a world imagined within the pattern on the stone.*

—W. Daniel Hillis, *The Pattern on the Stone: The Simple Ideas That Make Computers Work*

The word *technomancy* is a neologism constructed from *techno-* (Greek τέχνη, *tékhnē*, “skill, art, craft”), meaning “relating to technology,” and *-mancy* (Greek μαντεία, *manteía*, “divination”), denoting “a form of divination” (*Wiktionary*). Like [necromancy](#), however, technomancy connotes more than divining with technology. It could mean technology so advanced it is indistinguishable from magic (*à la* [Clarke’s Third Law](#)), e.g., the [Technomages of Babylon 5](#) and the [Technomancers of Mage: The Ascension](#). Or it could mean a [magic-like ability to control technology](#), as with the [technomancers of Shadowrun](#). Or it could mean a weird combination of magic and technology, such as in [GURPS: Technomancer](#), and the Cybermages of [Nightbane](#).

For the purposes of Technomancy 101, technomancy means performing acts of magic with modern technology, and people who practice technomancy are called technomancers. This is akin to [technopaganism](#), although pagan has religious connotations in addition to magical ones (many pagans practice magic as part of their religion or spirituality). By magic I mean the [stuff that sorcerers, wizards, and witches get up to](#); not [legerdemain](#). Although there are many modern technologies whose use in the magical arts may qualify as technomancy, Technomancy 101 focuses on computers and computational media because they are often implied in popular usage of the the word technomancy and related words such as technoshamanism, techgnosis, and technoetic; and because the computer is such a wonderfully versatile medium with which to explore the conjunction of magic and machine. My intention here is to communicate a basic idea of magic that is complementary to technology in a way that renders technomancy plausible, and to that end the definition I find most appropriate comes from Jesper Sørensen’s *A Cognitive Theory of Magic*: “Magic is about changing the state or essence of persons, objects, acts and events through certain special and non-trivial kinds of actions with opaque causal mediation.”

High Tech, Low Magic: *Some folks may disdainfully call this approach “low magick.” However, if you compare magick to computer technology, it’s the low-level coding that is the closest to the source. The higher you get, the more you are moving away from the source, altering the language to suit other purposes.*

—Laura Tempest Zakroff, *Sigil Witchery: A Witch’s Guide to Crafting Magick Symbols*

If numina are where magic and religion overlap, then sorcery is where magic and technology overlap. As an introduction to doing magic with computers, *Technomancy 101* focuses on sorcery, and the projects are organized by the following categories (not intended as the definitive taxonomy of magic, but simply a convenient way to organize the projects), symbolized by the five classical elements and their corresponding instruments:

- **Enchantment** (Fire, Wand) — eliciting intentional change in the world via occult means
- **Divination** (Water, Cup) — acquiring knowledge or making decisions via occult means
- **Evocation** (Air, Sword) — calling *forth* entities for divination or enchantment
- **Invocation** (Earth, Pentacle) — calling *in* entities for divination or enchantment
- **Illumination** (Æther, Lamp) — eliciting changes to the magician herself

In many ways, *Technomancy 101* is about space. It is especially about the intersection of cyberspace and magic space.

Cyberspace is partially a literalization of spatial metaphors about computer networks: the world wide web, which we navigate with a browser when we go to a web address or site. Such metaphors arise out of our embodied experiences as actors in physical spaces interacting with other bodies occupying those spaces, but they become their own things conceptually and, to some extent, somatically. (...) We play a kind of pretend when we interact with, and within, a chat room; a sort of consensual hallucination: con-sensual meaning “to sense together,” and hallucination meaning “apparent perception of an external object when no such object is actually present”. The chat room is kin to all kinds of virtual reality: it is hallucination made real. We sort of make believe also when we cast a magic circle wherein to perform an act of ritual magic. A circle may be cast by physically drawing it with some instrument, or simply visualizing it in the mind’s eye, and performing some activity to activate it.

Heretofore the discourse about doing magic with computers has been dominated by a conflation of cyberspace and the astral plane, which foregrounds an active mental or subtle body that is both metaphysically and ontologically distinct from a dormant physical or gross body, and which privileges ideal forms (including in-form-ation itself). But cyberspace— computer space – is much more than virtual reality or online spaces such as the Internet or “the cloud.” It is also: the space

between a computer and its user (or rather, its inter-actor); the space wherein a computer acts on, reacts to, or interacts with the physical world; the space in which the potential of a computer, computer program, or computational media is realized; and the space wherein a computational mechanism is conjoined with its correlated discourse.

Technomancy 101 takes a different tack by focusing on interaction and interactivity, and emphasizing the performativity and materiality of artifacts whether physical or digital, over the virtuality of digital artifacts. It rejects (or at least refuses to privilege) Gnostic and Cartesian dualism and Platonic idealism, and is instead more aligned with an enactivistic philosophy of mind (the mental is always already physical). Technomancy 101 is about acting with technology, and the programming language we use is explicitly modeled on theatre: it involves a stage on which one or more sprites act according to one or more scripts that have been prepared for them.

**<https://technomancy101.com> by Joshua Madara. Introduction.**

It contains some insights and useful tools for the practice of – in the author's own words – “advanced cybermagic for beginners”

○

“But regardless of the dangers which magic posed, the bourgeoisie had to combat its power because it undermined the principle of individual responsibility, as magic placed the determinants of social action in the realm of the stars, out of their reach and control.

Thus, in the rationalization of space and time that characterized the philosophical speculation of the 16th and 17th centuries, prophecy was replaced with the calculation of probabilities whose advantage, from a capitalist viewpoint, is that here the future can be anticipated only insofar as the regularity and immutability of the system is assumed; that is, only insofar as it is assumed that the future will be like the past, and no major change, no revolution, will upset the coordinates of individual decision-making. Similarly, the bourgeoisie had to combat the assumption that it is possible to be in two places at the same time, for the fixation of the body in space and time, that is, the individual's spatio-temporal identification, is an essential condition for the regularity of the workprocess.” p.143

“The incompatibility of magic with the capitalist work-discipline and the require of social control is one of the reasons why a campaign of terror was launched against it by the State - a terror applauded without reservations by many who are presently considered among the founders of scientific rationalism: Jean Bodin, Mersenne, the mechanical philosopher and member of the Royal Society Richard Boyle, and Newton's teacher, Isaac Barrow. Even the materialist Hobbes, while keeping his distance, gave approval. "As for witches," he wrote, "I think not that their witchcraft is any real power; but yet that they are justly punished, for the false belief they have that they can do such mischief, joined with their purpose to do it if they can." (Leviathml 1963: 67). He added that if these superstitions were eliminated, "men would be much more fitted than they are for civil obedience" (ibid.). Hobbes was well advised. The stakes on which witches and other practitioners of magic died, and the chambers in which their tortures were executed, were a laboratory in which much social discipline was sedimented, and much knowledge about the body was gained. Here those irrationalities were eliminated that stood in the way of the transformation of the individual and social body into a set of predictable and controllable mechanisms. And it was here again that the scientific use of torture was born, for blood and torture were necessary to "breed an animal" capable of regular, homogeneous, and uniform behavior, indelibly marked with the memory of the new rules (Nietzsche 1965: 189-90).

(...)

“The inspirational force of the need for social control is evident even in the field of astronomy. A classic example is that of Edmond Halley (the secretary of the Royal Society) who, in concomitance with the appearance in 1695 of the comet later named after him, organized clubs all over England in order to demonstrate the predictability of natural phenomena, and to dispel the popular belief that comets announced social disorder. That the path of scientific rationalization intersected with the disciplining of the social body is even more evident in the social sciences. We can see, in fact, that their development was premised on the homogenization of social behavior, and the construction of a prototypical individual to whom all would be expected to conform. In Marx's terms, this is an "abstract individual," constructed in a uniform way, as a social average, and subject to a radical decharacterization. so that all of its faculties can be grasped only in their most standardized aspects. The construction of this new individual was the basis for the development of what William Petty would later call (using Hobbes' terminology) Political Aritmetics- a new science that was to study every form of social behavior in terms of Numbers, Weights, and Measures. Petty's project was realized with the development of statistics and demography (Wilson 1966; Cullen 1975) which perform on the social body the same operations that anatomy performs on the individual body, as they dissect the population and study its movements - from natality to mortality rates, from generational to occupational structures - in their most massified and regular aspects. Also from the point of view of the abstraction process that the individual underwent in the transition to capitalism, we can see that the development of the "human machine" was the main technological leap, the main step in the development of the productive forces that took place in the period of primitive accumulation. We can see, if, other words, that the human body and not the steam engine, and not even the clock, was the first machine developed by capitalism.” p.146

(...)

“Indeed, there is no evidence that the new science had a liberating effect. The mechanistic view of Nature that came into existence with the rise of modern science "disenchanted the world." But there is no evidence that those who promoted it ever spoke in defense of the women accused as witches. Descartes declared himself an agnostic on this matter; other mechanical philosophers like Joseph Glanvil and Thomas Hobbes) strongly supported the witch-hunt. What ended the witch-hunt (as Brian

Easlea has convincingly shown) was the annihilation of the world of the witches and the imposition of the social discipline that the victorious capitalist system required. In other words, the witch-hunt came to an end, by the late 17th century, because the ruling class by this time enjoyed a growing sense of security concerning its power, not because a more enlightened view of the world had emerged.” p. 202

— **Silvia Federici. Caliban and the Witch: Women, the Body and Primitive Accumulation, Autonomedia, 2004**

renforçant le monopole de l'industrie des semenciers qui impose ses semences « certifiées » en empêchant les reproductions naturelles et hñde la biodiversité. Ceux qui se prétendent nos sauveurs seraient-ils bien au contraire nos oppresseurs ?

Par exemple, la fondation Bill et Melinda Gates, qui declare être une entreprise philanthropique à qui veut bien la croire, a été épinglée en mars 2015 (avec la United States Agency for International Development) en train de négocier un accord qui permettrait la privatisation des graines de plusieurs pays africains, les propulsant dans une agriculture industrielle radicalement contraire à leurs intérêts et à leurs besoins.

Dans un tel contexte, que veut dire un lieu tel que la Seed Vault ? Que nos technologies avancées ont détruit le monde ou que le monde va être sauvé par elles ? Comme souvent le message est aussi souterrain que ces graines enterrées. Mais il donne l'alerte sur un mode opaque, cryptique, ésotérique : quelque chose d'extrême se passe qui met en danger notre survie, en l'occurrence par le possible épuisement de nos ressources alimentaires.

La magie intersubjective ne fait pas *nécessairement* appel à des créatures fantastiques. Giordano Bruno l'a parfaitement démontré dans deux courts mais riches textes traitant de la magie et des « licens »<sup>1</sup>. Il

<sup>1</sup> - Giordano Bruno, *De la magie*, Éditions Albin, Paris, 2000 / *Das Kunst, Editionen Albin*, Jank, 2001.

est d'ailleurs étrange que Bruno qui semble incapable de comprendre suffisamment les points de vue des autres pour rendre les siens acceptables, aveuglément double d'orgueil qui le mènent au bñcher, soit un des grands développeurs de l'art de la magie par les liens, autrement dit de la manipulation.

On peut y lire sous l'habituel style railleur, voire insultant, de Bruno : « [...] Les mots de *magie* et de *magie* peuvent être entendus selon une acception infamante [...] (où) le mage est tenu pour un fou malfaisant qui, en vertu d'un commerce et d'un pacte avec le diable, a acquis la faculté de prêter assistance ou de porter préjudice. [...] Tel qu'on l'emploie chez les philosophes, ce mot de *magie* désigne un homme alliant le savoir au pouvoir d'agir »<sup>1</sup>. Et il liste trois types de magies, la divine, la naturelle et la mathématique (au sens du XVII<sup>e</sup> siècle). Cette dernière, qui est celle qui nous concerne, étant bonne ou mauvaise selon l'usage qu'on en fait. Elle a des caractéristiques de contiguïté avec les disciplines scientifiques : la géométrie par l'utilisation de symboles, l'arithmétique par le calcul, la musique par l'incantation, l'optique par les « fascinations du regard », etc.

À ce propos, Couliano dit que « cette compréhension [de l'âme et à sonder ses possibilités latentes] qui est moins une science qu'un art, à cause de l'habileté qu'il faut déployer pour surprendre les secrets du pays

<sup>1</sup> - Giordano Bruno, *De la magie*, Éditions Albin, Paris, 2000 / *Das Kunst, Editionen Albin*, Jank, 2001.



En définitive, il y a dans l'imaginaire contemporain, qu'il soit artistique, littéraire ou scientifique, une conjonction de réflexions et d'extrapolations, à partir de « créatures », d'êtres fabriqués, qui deviennent des paradigmes d'une autre humanité ou d'une posthumanité, qui en fait est déjà là. Car, bien entendu, la science-fiction ne peut extrapoler qu'à partir de son présent.

On a à faire à des objets hybrides qui relèvent à la fois de la nature et de la culture, mais qui ont la particularité de venir « de nulle part » ou bien d'on ne sait où. On oublie souvent qu'Haraway fait une triangulation en omettant l'animal contenu dans sa proposition. Car en effet les frontières qui séparent humains, animaux et machines sont devenues caduques. L'humain, l'animal, le végétal sont devenus de purs artefacts. Il apparaît plus fructueux aujourd'hui de penser par processus et dispositifs dans lesquels évoluent des hybrides parfois non identifiés, mélanges d'humains, d'animaux, de végétaux et d'artefacts.

L'ontologie humaine est une recreation permanente dont la matière est ce qui l'entoure, environnement et organismes, le sien et ceux des autres. Les humains habitent le monde avec une stratégie vampirique. Les manipulations génétiques partout généralisées, la robotique autonome, les nanotechnologies autogénératives, la biologie moléculaire rendent inopérante toute classification ontologique. L'animal fabriqué dans un laboratoire a de multiples géniteurs bien plus impliqués dans sa naissance que ses géniteurs de filiation. Le vampire produit la matière qui alimente la fiction qu'il a construite et qui constitue

...ie, voici donc un domaine que l'art ne peut éviter».  
L'art mettait irrémédiablement un pied dans le laboratoire, se confrontant à la puissance autant qu'à la fragilité de la création du vivant comme le font les sciences de la vie. Il se faisait ainsi le révélateur de pratiques scientifiques très largement ignorées. C'était une tentative de déterminer par d'autres biais ce qu'est un être humain, son ontologie, et ce qu'il est en train d'y modifier.

Dans son livre sur *La science dans l'art*<sup>2</sup>, Lionel Salem, chimiste français, redéfinit le champ d'action du bio-art. Pour lui, la technologie est un discours sur la science et les biotechnologies sont un discours sur les sciences de la vie. Le bio-art serait un discours sur la vie qui prend la forme de la production d'une œuvre. Il pointe à nouveau cette étrangeté d'avoir des objets hybrides, où l'art n'est plus seulement artefact, mais où la vie elle-même devient artificialité dans les mains des bio-artistes. Cet état de fait est redoublé d'un autre

paradoxe, car ces artistes créent une nouvelle réalité, et non une métaphore – exactement comme le font les scientifiques.

tuels quels qu'ils soient). La puissance imaginative est très fortement mise à contribution avec des machines complexes (un ordinateur par exemple, même le moins puissant) dont l'utilisateur ne comprend la plupart du temps que des bribes de la logique de sa formalisation, et dont il n'utilise qu'une petite partie des capacités.

Dans son livre de 1958 sur « le mode d'existence des objets techniques », Gilbert Simondon affirme dès le début de son texte que notre culture est asymétrique dans son traitement des objets. Alors que les objets esthétiques sont considérés comme dignes d'appartenir à un monde signifiant, les objets techniques sont « refoulés dans un monde sans structure », où ils n'ont qu'utilité et pas de signification. L'objet technique s'en retrouve par rebond investi par ceux qui les pratiquent de la même façon que l'est un objet sacré, menant à un « technicisme intempérant qui n'est qu'une idolâtrie de la machine » qui s'accompagne d'« une aspiration technocratique au pouvoir inconditionnel ». Il prend alors le cas du robot (« la machine

androïde »), comme exemple de machine capable de dominer les humains. Car c'est, selon lui, celle devant laquelle on abdique. Or, dit-il, « ce double de l'homme représente de façon bien évidente et inévitable un être purement mythique et imaginaire ». Le robot chez Simondon en 1958, « n'existe pas, n'est pas une machine, pas plus qu'une statue n'est un être vivant, mais seulement un produit de l'imagination et de la fabrication fictive, de l'art d'illusion ». Et il ajoute, « un homme cultivé ne se permettrait pas de parler des objets ou des personnages peints sur une toile comme de véritables réalités, ayant une intériorité, une volonté bonne ou mauvaise. Ce même homme parle pourtant des machines comme s'il attribuait à ces objets une âme et une existence séparée, autonome, qui leur confère l'usage de sentiments et d'intentions envers l'homme ».

Simondon souligne là un paradoxe irréductible de notre culture qui matérialise radicalement les objets techniques en leur ôtant toute autre fonction qu'utilitaire, mais investissant certains d'entre eux du rôle de l'adversaire, de l'ennemi que l'incompréhension et la peur des technologies peut susciter. Bien entendu, les objets techniques ne sont pas la science. Ils en sont une cristallisation dans le monde réel. Cristallisation avec toutes les facettes que cela suppose.

*« Any sufficiently advanced technology is indistinguishable from magic. »<sup>1</sup>*

Arthur C. Clarke

*« Any technology distinguishable from magic is insufficiently advanced. »<sup>2</sup>*

Barry Gheims

<sup>1</sup> - Les trois lois de Clarke.

<sup>2</sup> - *Analog Science Fiction & Fact Magazine*, 1991.

## CHAPITRE 9

# Chamanisme transversal

Repassons par le chamanisme, que nous avons évoqué plus haut, dans l'abrégé de la théorie perspectiviste. Du fait d'être capables de voir les autres espèces comme celles-ci se voient – comme humaines –, les chamanes amazoniens jouent le rôle de diplomates cosmopolitiques dans une arène où s'affrontent les divers intérêts socionaturels. En ce sens, la fonction du chamane n'est pas essentiellement différente de la fonction du guerrier. Toutes deux sont des commutateurs ou des conducteurs de perspectives ; le premier opère dans la zone interspécifique, le second dans la zone interhumaine ou intersociétaire<sup>1</sup>. Ces zones se superposent intensivement, plus qu'elles ne se disposent extensivement en relation d'adjacence horizontale ou d'englobement vertical. Le chamanisme amazonien, comme on l'a souvent remarqué, est le prolongement de la guerre par d'autres moyens. Cela n'a rien à voir pourtant avec la violence en soi<sup>2</sup>, mais bien avec la communication – une communication transversale entre des incommunicables, une comparaison dangereuse et délicate entre perspectives dans laquelle la position d'humain est perpétuellement disputée. À qui revient la position d'humain ici ? – telle est toujours la question qui se pose lorsqu'un individu se

1. N'oublions pas que chaque espèce possède ses propres chamanes, et que la relation des chamanes humains avec les autres espèces se noue, surtout, avec les chamanes de ces espèces avec lesquelles il est allié.

2. Même si les chamanes sont fréquemment des auxiliaires indispensables à la guerre, soit comme oracles, soit comme guerriers de l'invisible.

C'est ici finalement que l'on peut commencer à obtenir un certain rendement de la théorie maussienne du sacrifice. Imaginons le schéma sacrificiel comme constituant une structure médiatrice saturée ou complète, connectant la polarité entre le sacrifiant (celui qui offre le sacrifice et en recueille les bénéfices) et le destinataire au moyen de la double intermédiation du sacrificateur (l'officiant du sacrifice) et de la victime. Imaginons les deux figures « sacrificielles » amazoniennes, le cannibalisme rituel et le chamanisme, comme dégénération d'un schéma maussien, dans le même sens que ce que disait Lévi-Strauss au sujet de l'échange restreint en tant que cas mathématiquement dégénéré de l'échange généralisé.

Une caractéristique distinctive du chamanisme amazonien, c'est que le chamane est *à la fois* l'officiant et le véhicule du sacrifice. C'est en lui que se réalise le « déficit de contiguïté » – le vide créé par la séparation entre corps et âme, l'externalisation soustractive des parties de la personne du chamane – capable de faire passer un flux sémiotique bienfaisant entre humains et non-humains. C'est le chamane lui-même qui passe de l'autre côté du miroir ; il n'envoie pas de délégués ou de représentants sous forme de victimes, il est la victime lui-même : un mort anticipé, tout comme le chamane Araweté qui, lors de ses voyages au ciel, est interpellé par les divinités cannibales de ce peuple en termes de « notre future nourriture » – la même expression que celle qu'utilisaient les Tupinambá, cinq siècles auparavant, pour s'adresser de façon moqueuse à leurs captifs de guerre<sup>1</sup>. On franchit le seuil d'un autre régime sociocosmique lorsque le chamane devient le sacrificateur d'autrui : lorsqu'il devient, par exemple, l'exécuteur de victimes humaines, l'administrateur de sacrifices offerts par les puissants, quelqu'un qui sanctionne des mouve-

1. Par ce raccourci araweté on retrouve le cannibalisme, réduction encore plus dramatique du schéma sacrificiel, où non seulement le sacrificateur-exécuteur s'identifie à la victime (deuil, mort symbolique, interdiction de manducation de l'ennemi), mais où le sacrifiant, c'est-à-dire, le groupe des dévoreurs, coïncide avec le destinataire du sacrifice. Simultanément, selon une torsion caractéristique, le schéma se dédouble, et le groupe d'où provient l'ennemi, poussé à la vengeance rituelle, devient, d'une part, une sorte de co-sacrifiant, celui qui semble « offrir » la victime, et, d'autre part, se définit comme un destinataire futur, le détenteur de la vengeance guerrière qu'il exercera fatalement contre le groupe des dévoreurs.



Thinking about what I should say to you made me think about what we learn in college; and what we unlearn in college; and then how we learn to unlearn what we learned in college and relearn what we unlearned in college, and so on. And I thought how I have learned, more or less well, three languages, all of them English; and how one of these languages is the one I went to college to learn. I thought I was going to study French and Italian, and I did, but what I learned was the language of power - of social power; I shall call it the father tongue.

This is the public discourse, and one dialect of it is speech-making-by politicians, commencement speakers, or the old man who used to get up early in a village in Central California a couple of hundred years ago and say things very loudly on the order of "People need to be getting up now, there are things we might be doing, the repairs on the sweathouse aren't finished and the tar-weed is in seed over on Bald Hill; this is a good time of day for doing things, and there'll be plenty of time for lying around when it gets hot this afternoon." So everybody would get up grumbling slightly, and some of them would go pick tarweed-probably the women. This is the effect, ideally, of the public discourse. It makes something happen, makes somebody - usually somebody else - do something, or at least it gratifies the ego of the speaker. The difference between our politics and that of a native Californian people is clear in the style of the public discourse. The difference wasn't clear to the White invaders, who insisted on calling any Indian who made a speech a "chief," because they couldn't comprehend, they wouldn't admit, an authority without supremacy-a non-dominating authority. But it is such an authority that I possess for the brief - we all hope it is decently brief - time I speak to you - I have no right to speak to you. What I have is the responsibility you have given me to speak to you.

The political tongue speaks aloud-and look how radio and television have brought the language of politics right back where it belongs - but the dialect of the father tongue that you and I learned best in college is a written one. It doesn't speak itself. It only lectures. It began to develop when printing made written language common rather than rare, five hundred years ago or so, and with electronic processing and copying it continues to develop and proliferate so powerfully, so dominatingly, that many believe this dialect - the expository and particularly the scientific discourse - is the highest form of language, the true language, of which all other uses of words are primitive vestiges.



And it is indeed an excellent dialect. Newton's Principia was written in it in Latin, and Descartes wrote Latin and French in it, establishing some of its basic vocabulary, and Kant wrote German in it, and Marx, Darwin, Freud, Boas, Foucault - all the great scientists and social thinkers wrote it. It is the language of thought that seeks objectivity.

I do not say it is the language of rational thought. Reason is a faculty far larger than mere objective thought. When either the political or the scientific discourse announces itself as the voice of reason, it is playing God, and should be spanked and stood in the corner. The essential gesture of the father tongue is not reasoning but distancing-making a gap, a space, between the subject or self and the object or other. Enormous energy is generated by that rending, that forcing of a gap between Man and World. So the continuous growth of technology and science fuels itself; the Industrial Revolution began with splitting the world-atom, and still by breaking the continuum into unequal parts we keep the imbalance from which our society draws the power that enables it to dominate every other culture, so that everywhere now everybody speaks the same language in laboratories and government buildings and head-quarters and offices of business, and those who don't know it or won't speak it are silent, or silenced. or unheard.

You came here to college to learn the language of power - to be empowered. If you want to succeed in business, government, law, engineering, science, education, the media, if you want to succeed, you have to be fluent in the language in which "success" is a meaningful word.

White man speak with forked tongue; White man speak dichotomy. His language expresses the values of the split world, valuing the positive and devaluing the negative in each redivision: subject/object, self/other, mind/body, dominant/submissive, active/passive, Man/Nature, man/woman, and so on. The father tongue is spoken from above. It goes one way. No answer is expected, or heard.

In our Constitution and the works of law, philosophy, social thought, and science, in its everyday uses in the service of justice and clarity, what I call the father tongue is immensely noble and indispensably useful. When it claims a privileged relationship to reality, it becomes dangerous and potentially destructive. It describes with exquisite accuracy the continuing destruction of the planet's ecosystem by its speakers. This

word from its vocabulary, "ecosystem," is a word unnecessary except in a discourse that excludes its speakers from the ecosystem in a subject/object dichotomy of terminal irresponsibility.

The language of the fathers, of Man Ascending, Man the Conqueror, Civilized Man, is not your native tongue. It isn't anybody's native tongue. You didn't even hear the father tongue your first few years, except on the radio or TV, and then you didn't listen, and neither did your little brother, because it was some old politician with hairs in his nose yammering. And you and your brother had better things to do. You had another kind of power to learn. You were learning your mother tongue.

Using the father tongue, I can speak of the mother tongue only, inevitably, to distance it -- to exclude it. It is the other, inferior. It is primitive: inaccurate, unclear, coarse, limited, trivial, banal. It's repetitive, the same over and over, like the work called women's work; earthbound, housebound. It's vulgar, the vulgar tongue, common, common speech, colloquial, low, ordinary, plebeian, like the work ordinary people do, the lives common people live. The mother tongue, spoken or written, expects an answer. It is conversation, a word the root of which means "turning together." The mother tongue is language not as mere communication but as relation, relationship. It connects. It goes two ways, many ways, an exchange, a network. Its power is not in dividing but in binding, not in distancing but in uniting. It is written, but not by scribes and secretaries for posterity: it flies from the mouth on the breath that is our life and is gone, like the outbreath, utterly gone and yet returning, repeated, the breath the same again always, everywhere, and we all know it by heart.

John have you got your umbrella I think it's going to rain. Can you come play with me? If I told you once I told you a hundred times. Things here just aren't the same without Mother, I will now sign your affectionate brother James. Oh what am I going to do? So I said to her I said if he thinks she's going to stand for that but then there's his arthritis poor thing and no work. I love you. I hate you. I hate liver. Joan dear did you feed the sheep, don't just stand around mooning. Tell me what they said, tell me what you did. Oh how my feet do hurt. My heart is breaking. Touch me here, touch me again. Once bit twice shy. You look like what the cat dragged in. What a beautiful night. Good morning, hello, goodbye, have a nice day, thanks. God damn you to hell you lying cheat. Pass the soy sauce please. Oh shit. Is it grandma's own sweet pretty dear? What am I going to tell her? There there don't cry. Go to sleep now, go to sleep....Don't go to sleep!

It is a language always on the verge of silence and often on the verge of song. It is the language stories are told in. It is the language spoken by all children and most women, and so I call it the mother tongue, for we learn it from our mothers, and speak it to our kids. I'm trying to use it here in public where it isn't appropriate, not suited to the occasion, but I want to speak it to you because we are women and I can't say what I want to say about women in the language of capital M Man. If I try to be objective I will say, "This is higher and that is lower," I'll make a commencement speech about being successful in the battle of life, I'll lie to you; and I don't want to.

Early this spring I met a musician, the composer Pauline Oliveros, a beautiful woman like a grey rock in a streambed; and to a group of us, women, who were beginning to quarrel over theories in abstract, objective language - and I with my splendid Eastern-women's-college training in the father tongue was in the thick of the fight and going for the kill - to us, Pauline, who is sparing with words, said after clearing her throat, "Offer your experience as your truth." There was a short silence. When we started talking again, we didn't talk objectively, and we didn't fight. We went back to feeling our way into ideas, using the whole intellect not half of it, talking with one another, which involves listening. We tried to offer our experience to one another. Not claiming something; offering something.

How, after all, can one experience deny, negate, disprove, another experience? Even if I've had a lot more of it, your experience is your truth. How can one being prove another being wrong? Even if you're a lot younger and smarter than me, my being is my truth. I can offer it; you don't have to take it. People can't contradict each other, only words can: words separated from experience for use as weapons, words that make the wound, the split between subject and object, exposing and exploiting the object but disguising and defending the subject.

People crave objectivity because to be subjective is to be embodied, to be a body, vulnerable, violable. Men especially aren't used to that; they're trained not to offer but to attack. It's often easier for women to trust one another, to try to speak our experience in our own language, the language we talk to each other in, the mother tongue; so we empower each other.

But you and I have learned to use the mother tongue only at home or safe among friends, and many men learn not to speak it at all. They're taught that there's no safe

place for them. From adolescence on, they talk a kind of degraded version of the father tongue with each other - sports scores, job technicalities, sex technicalities, and TV politics. At home, to women and children talking the mother tongue, they respond with a grunt and turn on the ball game. They have let themselves be silenced and dimly they know it, and so resent speakers of the mother tongue; women babble, gabble all the time.... Can't listen to that stuff.

Our schools and colleges, institutions of the patriarchy, generally teach us to listen to people in power, men or women speaking the father tongue; and so they teach us not to listen to the mother tongue, to what the powerless say, poor men, women, children: not to hear that as valid discourse.

I am trying to unlearn these lessons, along with other lessons I was taught by my society, particularly lessons concerning the minds, work, works, and being of women. I am a slow unlearner. But I love my unteachers - the feminist thinkers and writers and talkers and poets and artists and singers and critics and friends, from Wollstonecraft and Woolf through the furies and glories of the seventies and eighties - I celebrate here and now the women who for two centuries have worked for our freedom, the unteachers, the unmasters, the unconquerors, the unwarriors, women who have at risk and at high cost offered their experience as truth. "Let us NOT praise famous women!" Virginia Woolf scribbled in a margin when she was writing *Three Guineas*, and she's right, but still I have to praise these women and thank them for setting me free in my old age to learn my own language.

The third language, my native tongue, which I will never know though I've spent my life learning it: I'll say some words now in this language. First a name, just a person's name, you've heard it before. Sojourner Truth. That name is a language in itself. But Sojourner Truth spoke the unlearned language; about a hundred years ago, talking it in a public place, she said, "I have been forty years a slave and forty years free and would be here forty years more to have equal rights for all." Along at the end of her talk she said, "I wanted to tell you a mite about Woman's Rights, and so I came out and said so. I am sittin' among you to watch; and every one and awhile I will come out and tell you what time of night it is." She said, "Now I will do a little singing. I have not heard any singing since I came here."<sup>1</sup>

Singing is one of the names of the language we never learn, and here for Sojourner Truth is a little singing. It was written by Joy Harjo of the Creek people and is called "The Blanket Around Her." 2

maybe it is her birth  
which she holds close to herself  
or her death  
which is just as inseparable  
and the white wind  
that encircles her is a part  
just as  
the blue sky  
hanging in turquoise from her neck  
oh woman  
remember who you are  
woman  
it is the whole earth

So what am I talking about with this "unlearned language" - poetry, literature? Yes, but it can be speeches and science, any use of language when it is spoken, written, read, heard as art, the way dancing is the body moving as art. In Sojourner Truth's words you hear the coming together, the marriage of the public discourse and the private experience, making a power, a beautiful thing, the true discourse of reason. This is a wedding and welding back together of the alienated consciousness that I've been calling the father tongue and the undifferentiated engagement that I've been calling the mother tongue. This is their baby, this baby talk, the language you can spend your life trying to learn.

We learn this tongue first, like the mother tongue, just by hearing it or reading it; and even in our overcrowded, underfunded public high schools they still teach A Tale of Two Cities and Uncle Tom's Cabin; and in college you can take four solid years of literature, and even creative writing courses. But. It is all taught as if it were a dialect of the father tongue.

Literature takes shape and life in the body, in the womb of the mother tongue: always: and the Fathers of Culture get anxious about paternity. They start talking about legitimacy. They steal the baby. They ensure by every means that the artist, the writer,

is male. This involves intellectual abortion by centuries of women artists, infanticide of works by women writers, and a whole medical corps of sterilizing critics working to purify the Canon, to reduce the subject matter and style of literature to something Ernest Hemingway could have understood.

But this is our native tongue, this is our language they're stealing: we can read it and we can write it, and what we bring to it is what it needs, the woman's tongue, that earth and savor, that relatedness, which speaks dark in the mother tongue but clear as sunlight in women's poetry, and in our novels and stories, our letters, our journals, our speeches. If Sojourner Truth, forty years a slave, knew she had the right to speak that speech, how about you? Will you let yourself be silenced? Will you listen to what men tell you, or will you listen to what women are saying? I say the Canon has been spiked, and while the Eliots speak only to the Lowells and the Lowells speak only to God, Denise Levertov comes stepping westward quietly, speaking to us. 3

There is no savor  
more sweet, more salt  
than to be glad to be  
what, woman,  
and who, myself,  
I am, a shadow  
that grows longer as the sun  
moves, drawn out  
on a thread of wonder.  
If I bear burdens  
they begin to be remembered  
as gifts, goods, a basket  
of bread that hurts  
my shoulders but closes me  
in fragrance. I can  
eat as I go.

As I've been using the word "truth" in the sense of "trying hard not to lie," so I use the words "literature," "art," in the sense of "living well, living with skill, grace, energy" - like carrying a basket of bread and smelling it and eating as you go. I don't mean only certain special products made by specially gifted people living in specially privileged garrets, studios, and ivory towers - "High" Art; I mean also all the low arts, the ones

men don't want. For instance, the art of making order where people live. In our culture this activity is not considered an art, it is not even considered work. "Do you work?" - and she, having stopped mopping the kitchen and picked up the baby to come answer the door, says, "No, I don't work. People who make order where people live are by doing so stigmatized as unfit for "higher" pursuits; so women mostly do it, and among women, poor, uneducated, or old women more often than rich, educated, and young ones. Even so, many people want very much to keep house but can't, because they're poor and haven't got a house to keep, or the time and money it takes, or even the experience of ever having seen a decent house, a clean room, except on TV. Most men are prevented from housework by intense cultural bias; many women actually hire another woman to do it for them because they're scared of getting trapped in it, ending up like the woman they hire, or like that woman we all know who's been pushed so far over by cultural bias that she can't stand up, and crawls around the house scrubbing and waxing and spraying germ killer on the kids. But even on her kneebones, where you and I will never join her, even she has been practicing as best she knows how a great, ancient, complex, and necessary art. That our society devalues it is evidence of the barbarity, the aesthetic and ethical bankruptcy, of our society.

As housekeeping is an art, so is cooking and all it involves - it involves, after all, agriculture, hunting, herding.... So is the making of clothing and all it involves.... And so on; you see how I want to revalue the word "art" so that when I come back as I do now to talking about words it is in the context of the great arts of living, of the woman carrying the basket of bread, bearing gifts, goods. Art not as some ejaculative act of ego but as a way, a skillful and powerful way of being in the world. I come back to words because words are my way of being in the world. I come back to words because words are my way of being in the world, but meaning by language as art a matter infinitely larger than the so-called High forms. Here is a poem that tries to translate six words by Hélène Cixous, who wrote *The Laugh of the Medusa*; she said, "Je suis là où ça parle," and I squeezed those six words like a lovely lemon and got out all the juice I could, plus a drop of Oregon vodka.

I'm there where  
it's talking  
Where that speaks I  
am in that talking place  
Where

that says  
my being is  
Where  
my being there  
is speaking  
I am  
And so  
laughing  
in a stone ear

The stone ear that won't listen, won't hear us, and blames us for its being stone....  
Women can babble and chatter like monkeys in the wilderness, but the farms and  
orchards and gardens of language, the wheatfields of art - men have claimed these,  
fenced them off: No Trespassing, it's a man's world, they say. And I say,

oh woman  
remember who you are  
woman  
it is the whole earth

We are told, in words and not in words, we are told by their deafness, by their stone  
ears, that our experience, the life experience of women, is not valuable to men -  
therefore not valuable to society, to humanity. We are valued by men only as an  
element of their experience, as things experienced; anything we may say, anything we  
may do, is recognized only if said or done in their service.

One thing we incontestably do is have babies. So we have babies as the male priests,  
lawmakers, and doctors tell us to have them, when and where to have them, how  
often, and how to have them; so that is all under control. But we are not to talk about  
having babies, because that is not part of the experience of men and so nothing to do  
with reality, with civilization, and no concern of art. - A rending scream in another  
room. And Prince Audrey comes in and sees his poor little wife dead bearing his son -  
Or Levin goes out into his fields and thanks his God for the birth of his son - And we  
know how Prince Audrey feels and how Levin feels and even how God feels, but we  
don't know what happened. Something happened, something was done, which we  
know nothing about. But what was it? Even in novels by women we are only just  
beginning to find out what it is that happens in the other room - what women do.



Freud famously said, "What we shall never know is what a woman wants." Having paused thoughtfully over the syntax of that sentence, in which WE are the plural but "a woman" apparently has no plural, no individuality - as we might read that a cow must be milked twice a day or a gerbil is a nice pet - WE might go on then to consider whether WE know anything about, whether WE have ever noticed, whether WE have ever asked a woman what she does - what women do.

Many anthropologists, some historians, and others have indeed been asking one another this question for some years now, with pale and affrighted faces - and they are beginning also to answer it. More power to them. The social sciences show us that speakers of the father tongue are capable of understanding and discussing the doings of the mothers, if they will admit the validity of the mother tongue and listen to what women say.

But in society as a whole the patriarchal mythology of what "a woman" does persists almost unexamined, and shapes the lives of women. "What are you going to do when you get out of school?" "Oh, well, just like any other woman, I guess I want a home and family" - and that's fine, but what is this home and family just like other women's? Dad at work, mom home, two kids eating apple pie? This family, which our media and now our government declare to be normal and impose as normative, this nuclear family now accounts for seven percent of the arrangements women live in in America. Ninety-three percent of women don't live that way. They don't do that. Many wouldn't if you gave it to them with bells on. Those who want that, who believe it's their one true destiny - what's their chance of achieving it? They're on the road to Heartbreak House. But the only alternative offered by the patriarchal mythology is that of the Failed Woman - the old maid, the barren woman, the castrating bitch, the frigid wife, the lezzie, the libber, the Unfeminine, so beloved of misogynists both male and female.

Now indeed there are women who want to be female men; their role model is Margaret Thatcher, and they're ready to dress for success, carry designer briefcases, kill for promotion, and drink the Right Scotch. They want to buy into the man's world, whatever the cost. And if that's true desire, not just compulsion born of fear, O.K.; if you can't lick 'em join 'em. My problem with that is that I can't see it as a good life even for men, who invented it and make all the rules. There's power in it, but not the kind of power I respect, not the kind of power that sets anybody free. I hate to see an

intelligent woman voluntarily double herself up to get under the bottom line. Talk about crawling! And when she talks, what can she talk but father tongue? If she's the mouthpiece for the man's world, what has she got to say for herself?

Some women manage it - they may collude, but they don't sell out as women; and we know that when they speak for those who, in the man's world, are the others: women, children, the poor.... But it is dangerous to put on Daddy's clothes, though not, perhaps, as dangerous as it is to sit on Daddy's knees.

There's no way you can offer your experience as your truth if you deny your experience, if you try to be a mythical creature, the dummy woman who sits there on Big Daddy's lap. Whose voice will come out of her prettily hinged jaw? Who is it says yes all the time? Oh yes, yes, I will. Oh I don't know, you decide. Oh I can't do that. Yes hit me, yes rape me, yes save me, oh yes. That is how A Woman talks, the one in What-we-shall-never-know-is-what-A-Woman-wants.

A Woman's place, need I say, is in the home, plus at her volunteer work or the job where she's glad to get sixty cents for doing what men get paid a dollar for but that's because she's always on pregnancy leave but childcare? No! A Woman is home caring for her children! even if she can't. Trapped in this well-built trap, A Woman blames her mother for luring her into it, while ensuring that her own daughter never gets out; she recoils from the idea of sisterhood and doesn't believe women have friends, because it probably means something unnatural, and anyhow, A Woman is afraid of women. She's a male construct, and she's afraid women will deconstruct her. She's afraid of everything, because she can't change. Thighs forever thin and shining hair and shining teeth and she's my Mom, too, all seven percent of her. And she never grows old.

There are old women - little old ladies, as people always say; little bits, fragments of the great dummy statue goddess A Woman. Nobody hears if old women say yes or no, nobody pays them sixty cents for anything. Old men run things. Old men run the show, press the buttons, make the wars, make the money. In the man's world, the old man's world, the young men run and run and run until they drop, and some of the young women run with them. But old women live in the cracks, between the walls, like roaches, like mice, a rustling sound, a squeaking. Better lock up the cheese, boys. It's terrible, you turn up a corner of civilization and there are all these old women running around on the wrong side-

I say to you, you know, you're going to get old. And you can't hear me. I squeak between the walls. I've walked through the mirror and am on the other side, where things are all backwards. You may look with a good will and a generous heart, but you can't see anything in the mirror but your own face; and I, looking from the dark side and seeing your beautiful young faces, see that that's how it should be.

But when you look at yourself in the mirror, I hope you see yourself. Not one of the myths. Not a failed man - a person who can never succeed because success is basically defined as being male - and not a failed goddess, a person desperately trying to hide herself in the dummy Woman, the image of men's desires and fears. I hope you look away from those myths and into your own eyes, and see your own strength. You're going to need it. I hope you don't try to take your strength from men, or from a man. Secondhand experience breaks down a block from the car lot. I hope you'll take and make your own soul; that you'll feel your life for yourself pain by pain and joy by joy; that you'll feed your life, eat, "eat as you go" - you who nourish, be nourished! If being a cog in the machine or a puppet manipulated by others isn't what you want, you can find out what you want, your needs, desires, truths, powers, by accepting your own experience as a woman, as this woman, this body, this person, your hungry self. On the maps drawn by men there is an immense white area, terra incognita, where most women live. That country is all yours to explore, to inhabit, to describe.

But none of us lives there alone. Being human isn't something people can bring off alone; we need other people in order to be people. We need one another.

If a woman sees other women as Medusa, fears them, turns a stone ear to them, these days, all her hair may begin to stand up on end hissing, Listen, listen, listen! Listen to other women, your sisters, your mothers, your grandmothers - if you don't hear them how will you ever understand what your daughter says to you?

And the men who can talk, converse with you, not trying to talk through the dummy Yes - Woman, the men who can accept your experience as valid - when you find such a man love him, honor him! But don't obey him. I don't think we have any right to obedience. I think we have a responsibility to freedom.

And especially to freedom of speech. Obedience is silent. It does not answer. It is contained. Here is a disobedient woman speaking, Wendy Rose of the Hopi and Miwok people, saying in a poem called "The Parts of a Poet," 4

parts of me are pinned  
to earth, parts of me  
undermine song, parts  
of me spread on the water,  
parts of me form a rainbow  
bridge, parts of me follow  
the sandfish, parts of me  
are a woman who judges.

Now this is what I want: I want to hear your judgments. I am sick of the silence of women. I want to hear you speaking all the languages, offering your experience as your truth, as human truth, talking about working, about making, about unmaking, about eating, about cooking, about feeding, about taking in seed and giving out life, about killing, about feeling, about thinking; about what women do; about what men do; about war, about peace; about who presses the buttons and what buttons get pressed and whether pressing buttons is in the long run a fit occupation for human beings. There's a lot of things I want to hear you talk about.

This is what I don't want: I don't want what men have. I'm glad to let them do their work and talk their talk. But I do not want and will not have them saying or thinking or telling us that theirs is the only fit work or speech for human beings. Let them not take our work, our words, from us. If they can, if they will, let them work with us and talk with us. We can all talk mother tongue, we can all talk father tongue, and together we can try to hear and speak that language which may be our truest way of being in the world, we who speak for a world that has no words but ours. I know that many men and even women are afraid and angry when women do speak, because in this barbaric society, when women speak truly they speak subversively - they can't help it: if you're underneath, if you're kept down, you break out, you subvert. We are volcanoes. When we women offer our experience as our truth, as human truth, all the maps change. There are new mountains.

That's what I want - to hear you erupting. You young Mount St. Helenses who don't know the power in you - I want to hear you. I want to listen to you talking to each other and to us all: whether you're writing an article or a poem or a letter or teaching a class or talking with friends or reading a novel or making a speech or proposing a law or giving a judgment or singing the baby to sleep or discussing the fate of nations,

I want to hear you. Speak with a woman's tongue. Come out and tell us what time of night it is! Don't let us sink back into silence. If we don't tell our truth, who will? Who'll speak for my children, and yours?

So I end with the end of a poem by Linda Hogan of the Chickasaw people, called "The Women Speaking." 5

Daughters, the women are speaking  
They arrive  
over the wide distances  
on perfect feet.  
Daughters, I love you.

1 Sojourner Truth, in *The Norton Anthology of Literature by Women*, ed. Sandra M. Gilbert and Susan Garber (New York: W.W. Norton & Co., 1985), pp. 255-56.

2 Joy Harjo. "The Blanket Around Her," in *That's What She Said: Contemporary Poetry and Fiction by Native American Women*, ed. Rayna Green (Bloomington: Indiana University Press, 1984), p. 127.

3 Denise Levertov, "Stepping Westward," in *Norton Anthology*, p. 1951.

4 Wendy Rose, "The Parts of a Poet," in *That's What She Said*, p. 204.

5 Linda Hogan, "The Women Speaking," in *ibid.*, p. 172.

— **Ursula Le Guin.** [https://serendipstudio.org/sci\\_cult/leguin/](https://serendipstudio.org/sci_cult/leguin/)

Ursula K. Le Guin gave this address at the 1986 Bryn Mawr College Commencement. It was first published in a collection of essays, *Dancing At The Edge of the World: Thoughts on Words, Women, Places*, New York: Harper & Row, 1989 (147-160).



## OF THINGS WRITTEN IN STONE



Everything dreams. The play of form, of being, is the dreaming of substance. Rocks have their dreams, and the earth changes...

— Ursula K. Le Guin



Human beings have from prehistoric times recognized the potentialities within the lithic to send communication across vast spans of time. Hence our fascination with structures like Stonehenge, designed to persist across atemporal duration no human culture can surmount. As information endurance devices, such rocks communicate long after their successive human co-dwellers have been obliterated. (...)

Human immediately becomes posthuman as a consequence of the enlarged temporal frame that geology demands. Such a stone-etched counter-vision invites reflection on what it means to inhabit a world that is potentially indifferent to humanity and yet is intimately continuous with us. (...)

Rocks possess much of what is supposed to set humans apart. They are neither inert nor mute, but like all life are forever flowing, forever filled with stories.

—**Jeffrey Cohen, *An Ecology of the Inhuman & Stories of Stone*, 2015, University of Minnesota Press**



Here is the Stillness, which is not still even on a good day. Now it ripples, reverberates, in cataclysm. Now there is a line, roughly east-west and too straight, almost neat in its manifest unnaturalness, spanning the girth of the land's equator. (...)

The line is deep and raw, a cut to the quick of the planet. Magma wells in its wake, fresh and glowing red. The earth is good at healing itself. This wound will scab over quickly in geologic terms, and then the cleansing ocean will follow its lie to bisect stillness into two lands. Until this happens, however, the wound will fester with not only heat but gas and gritty, dark ash - enough to choke off the sky across most of the Stillness's face within a few weeks. Plants everywhere will die, and the animals that

depend on them will starve, and the animals that eat those will starve. Winter will come early, and hard, and it will last a long, long time. It will end, of course, like every winter does, and then the world will return to its old self. Eventually. Eventually. (...) Eventually meaning in this case in a few thousand years.

—NK Jemisin, *The Broken Earth Trilogy, Orbit, 2015-2017*

○

In its exile from the Earth's simmering interiority, crustal rock provides a platform and venue for biological life. Living things can approach, engage, even ingest this minority of minerals. Indeed, here rock and life transform each other, generating composite formations—rocks assembled out of once-living bodies, biological bodies composed in part of minerals. But we should not forget that this florid organic-inorganic interface is but a 'gloss on the surface' of our astronomical body, and that the stone that invites life's embrace is a chilled and pallid shadow of its seething progenitors.

—Nigel Clark

○

In all of history the crystal is perhaps the most overloaded symbol; used by writers, prophets, medicine-man and orators of all times to express in one clear psychogeonomic object otherworldliness. Novalis, poet and student of mining, held the crystal to be a dark, soul-eating parasite transforming the human heart into the dead cold of a stone; some believe it to be an early apocalyptic warning against the cyborg. The sentiment is easily understood; is it, after all, not true that it is with more than just amazement we listen to the stories about that Indian sect that refuses to eat anything organic and, consequently, rather suck on amethyst for the rest of their life than touch organic matter, even when it is as profane as centipede-excrement.

Mineral cults evoke in us absolute horror and disgust, suggesting crystal-phobia lurking at the deep of our instincts. Crystalpunks are challenging the basic conditions of their humanity. But at least one standard metaphorical use of the crystal, that of the crystal as object of utopian perfection, as pure geometrical-molecular-ethnicity, in most cases turns out to be a chemical fiction. One of the most interesting qualities of crystals is their ability to encapsulate alien particles.

Crystals too produce noise, as one flaw entered during packing distorts tessellation for ever after.”

—The Crystalpunk Manifesto, <http://cryptoforest.blogspot.com/2011/10/approved-crystalpunk-manifesto.html>

○

The Anthropocene marks the fall of humanity from cosmic Big History into terrestrial Deep Time. The Big History narrative is an evolutionary epic, a bio-centric teleological tale of emergence and ascending complexity that culminates in a cosmic anthropic vision of human beings as the universe becoming conscious of itself. By contrast, Deep Time is a rocky ride, a disaster movie, a lithic-centric cyclic story of explosions and extinctions, periods of equilibrium punctuated by catastrophes, which in turn open niches in new fitness landscapes for opportunists to fill.

The geologic record, the rock cycle, the movements of tectonic plates, stratigraphy: these all remind us that the earth is not a ground but a process of ungrounding and regrounding, a layered history of layers punctured by unconformities, gaps and skips in the record.

—Paul A. Harris, Richard Turner, A.J. Nocek, **Rock Records, SubStance Volume 47, Number 2, 2018 (Issue 146)**

●

Rock is passionless. “Stone hearted” and “cold as stone” are as much a part of our lithic vocabulary as various expressions for stony silence. Without a human hand to impress meaning upon it, stone would be blank, impassive, aloof. Immobile and sterile, stones do not do much. Or perhaps our lexicon for stone is impoverished. When observed within their particular and non-human duration, stones are forever on the move.

—Jeffrey Jerome Cohen





Deleuze and Guattari introduce the concept of a “machinic phylum,” which they define as “materiality, natural or artificial, and both simultaneously; it is matter in movement, in flux, in variation, matter as a conveyor of singularities and traits of expression”. Because of its constant flow and variation, the machinic phylum is very hard to measure indeed. Therefore, Deleuze and Guattari argue that the “matter-flow can only be followed”

—**Patricia Pisters, "Deep Blue Geomediations: Following Lapis Lazuli in Three Ecological Assemblage"**

in *SubStance*, Volume 47, Number 2, 2018 (Issue 146), pp. 36-58 (Article)



Despite software's abstraction the geological maintains a particular attraction, as earth substrate, that which surrounds us, our material. Substrate equally presents a set of economic, political and economic consequences which contrast with software's lack of coded visibility, its inevitable “encryption”.

—**Martin Howse, Earthcode <https://1010.co.uk/org/earthcode.html>**



A post-digital re-reading of his stones might invoke entirely new kinds of narratives. By reinterpreting Caillois's stones in relation to the aesthetics of digital simulation, algorithmic visualization can be used as decryption device to decode and unravel new fictions.

The crystal deposits in stones might now chronicle the arching trajectories of boids as they trace pathways defined by chaotic parabolas of a Lorenz Attractor. In other rocks, mineral accretions may delineate facsimiles of reaction diffusion patterns—the scattered pointillist aftermaths of activator-inhibitor liaisons. Other patterns tell tales of cellular automata self-assembling themselves into unpredictable, but scrutable patterns—Conway's Game of Life frozen inside a crystalline snapshot. So, the stones become a collective unconscious for dynamical systems, an oblique strategy for algo-poetic revelry, and a divination system for generative pattern recognition.

(...) their values are intrinsic and without external reference," might he be imagining a kind of geological Turing Completeness?—a universal lithic calculating machine whose solution is its own morphology (Turing). This possibility echoes the inklings of tantric cybernetician Stafford Beer in *Pebbles to Computers* who saw that "Nature's computers are that which they compute" and who maintained that "We cannot read off numbers" from these calculations "because nature does not put labels on its solutions—it becomes them". The sealed language of stones...

—Paul Prudence from *Caillois, R. The Writing of Stones*

<https://aaaaarg.fail/thing/52af6179307888c801000016>



Since their translation more than a century ago, it has not escaped the notice of esotericists that there is a distinctly alchemical idiom to the Pyramid Texts with their reference to stones, metals and distinct processes of magical transformation. If geopolymerisation was used in the Old Kingdom's grand, astrotheological building project it certainly becomes a part of the legend that grew over the millennia into what we now call alchemy.

From earlier cultures Egypt inherited much of its star lore as well as the sanctity of stone. The innovations she brought to these beliefs were dramatically improved forms of masonry and a calendrical and mathematical sophistication that went unequalled for thousands of years. (...) We may speculate here that entangling one's consciousness with certain stars lead to certain 'inspirations/innovations', which improved the technology of consciousness entanglement, which lead to further 'inspirations/innovations'. Think of it like a cosmic version of runaway climate change.

—Gordon White, *Starships: A Prehistory of the Spirits, Scarlet Imprint, 2016*



Simulated annealing (SA) is a probabilistic technique for approximating the global optimum of a given function. Specifically, it is a metaheuristic to approximate global optimization in a large search space for an optimization problem. It is often used when the search space is discrete (e.g., all tours that visit a given set of cities). For problems where finding an approximate global optimum is more important than finding a precise

local optimum in a fixed amount of time, simulated annealing may be preferable to alternatives such as gradient descent.

The name and inspiration come from annealing in metallurgy, a technique involving heating and controlled cooling of a material to increase the size of its crystals and reduce their defects. Both are attributes of the material that depend on its thermodynamic free energy. Heating and cooling the material affects both the temperature and the thermodynamic free energy. The simulation of annealing can be used to find an approximation of a global minimum for a function with a large number of variables”

[https://en.wikipedia.org/wiki/Simulated\\_annealing](https://en.wikipedia.org/wiki/Simulated_annealing)

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## The Author of the Acacia Seeds

And Other Extracts from the  
*Journal of the Association  
of Therolinguistics*

MS. FOUND IN AN ANTHILL

The messages were found written in touch-gland exudation on degerminated acacia seeds laid in rows at the end of a narrow, erratic tunnel leading off from one of the deeper levels of the colony. It was the orderly arrangement of the seeds that first drew the investigator's attention.

The messages are fragmentary, and the translation approximate and highly interpretative; but the text seems worthy of interest if only for its striking lack of resemblance to any other Ant texts known to us.

Shark or Tarpon is utterly different from the joyous vigor of all Cetacean scripts. The joy, the vigor, and the humor are all shared by Penguin authors; and, indeed, by many of the finer Seal auteurs. The temperature of the blood is a bond. But the construction of the brain, and of the womb, makes a barrier! Dolphins do not lay eggs. A world of difference lies in that simple fact.

Only when Professor Doby reminded us that penguins are birds, that they do not swim but fly in water, only then could the therologist begin to approach the sea literature of the penguin with understanding; only then could the miles of recordings already on film be restudied and, finally, appreciated.

But the difficulty of translation is still with us.

A satisfying degree of promise has already been made in Adélie. The difficulties of recording a group kinetic performance in a stormy ocean as thick as pea soup with plankton at a temperature of 31° Fahrenheit are considerable; but the perseverance of the Ross Ice Barrier Literary Circle has been fully rewarded with such passages as "Under the Iceberg," from the *Autumn Song*—a passage now world famous in the rendition by Anna Serebryakova of the Leningrad Ballet. No verbal rendering can approach the felicity of Miss Serebryakova's version. For, quite simply, there is no way to reproduce in writing the all-important *multiplicity* of the original text, so beautifully rendered by the full chorus of the Leningrad Ballet company.

Indeed, what we call "translations" from the

Adélie—or from any group kinetic text—are, to put it bluntly, mere notes—libretto without the opera. The ballet version is the true translation. Nothing in words can be complete.

I therefore suggest, though the suggestion may well be greeted with frowns of anger or with hoots of laughter, that for the *therologist*—as opposed to the artist and the amateur—the kinetic sea writings of Penguin are the *least* promising field of study: and, further, that Adélie, for all its charm and relative simplicity, is a less promising field of study than is Emperor.

Emperor!—I anticipate my colleagues' response to this suggestion. Emperor! The most difficult, the most remote, of all the dialects of Penguin! The language of which Professor Doby himself remarked, "The literature of the emperor penguin is as forbidding, as inaccessible, as the frozen heart of Antarctica itself. Its beauties may be unearthly, but they are not for us."

Maybe. I do not underestimate the difficulties: not least of which is the imperial temperament, so much more reserved and aloof than that of any other penguin. But, paradoxically, it is just in this reserve that I place my hope. The emperor is not a solitary, but a social bird, and while on land for the breeding season dwells in colonies, as does the adélie; but these colonies are very much smaller and very much quieter than those of the adélie. The bonds between the members of an emperor colony are rather personal than social. The emperor is an individualist. Therefore I think it almost certain that the literature of the

emperor will prove to be composed by single authors, instead of chorally; and therefore it will be translatable into human speech. It will be a kinetic literature, but how different from the spatially extensive, rapid, multiplex choruses of sea writing! Close analysis, and genuine transcription, will at last be possible.

What! say my critics—Should we pack up and go to Cape Crozier, to the dark, to the blizzards, to the  $-60^{\circ}$  cold, in the mere hope of recording the problematic poetry of a few strange birds who sit there, in the mid-winter dark, in the blizzards, in the  $-60^{\circ}$  cold, on the eternal ice, with an egg on their feet?

And my reply is, Yes. For, like Professor Duby, my instinct tells me that the beauty of that poetry is as unearthly as anything we shall ever find on earth.

To those of my colleagues in whom the spirit of scientific curiosity and aesthetic risk is strong, I say, Imagine it: the ice, the scouring snow, the darkness, the ceaseless whine and scream of wind. In that black desolation a little band of poets crouches. They are starving; they will not eat for weeks. On the feet of each one, under the warm belly feathers, rests one large egg, thus preserved from the mortal touch of the ice. The poets cannot hear one another; they cannot see one another. They can only feel the other's *warmth*. That is their poetry, that is their art. Like all kinetic literatures, it is silent; unlike other kinetic literatures, it is all but immobile, ineffably subtle. The ruffling of a feather; the shifting of a

wing; the touch, the slight, faint, warm touch of the one beside you. In unutterable, miserable, black solitude, the affirmation. In absence, presence. In death, life.

I have obtained a sizable grant from UNESCO and have stocked an expedition. There are still four places open. We leave for Antarctica on Thursday. If anyone wants to come along, welcome!

—D. Petri

EDITORIAL, BY THE PRESIDENT OF  
THE THEROLINGUISTICS ASSOCIATION

What is Language?

This question, central to the science of therolinguistics, has been answered—heuristically—by the very existence of the science. Language is communication. That is the axiom on which all our theory and research rest, and from which all our discoveries derive; and the success of the discoveries testifies to the validity of the axiom. But to the related, yet not identical question, What is Art? we have not yet given a satisfactory answer.

Tolstoy, in the book whose title is that very question, answered it firmly and clearly. Art, too, is communication. This answer has, I believe, been accepted without examination or criticism by therolinguistics. For example: Why do therolinguists study only animals?

Why, because plants do not communicate.

Plants do not communicate; that is a fact. Therefore plants have no language; very well: that follows from our basic axiom. Therefore, also, plants have no art. But slay! That does not follow from the basic axiom, but only from the unexamined Tolstoyan corollary.

What if art is not communicative?

Or, what if some art is communicative, and some art is not?

Ourselves animals, active, predators, we look (naturally enough) for an active, predatory, communicative art; and when we find it, we recognise it. The development of this power of recognition and the skills of appreciation is a recent and glorious achievement.

But I submit that for all the tremendous advances made by therolinguistics during the last decades, we are only at the beginning of our age of discovery. We must not become slaves to our own axioms. We have not yet lifted our eyes to the vaster horizons before us. We have not faced the almost terrifying challenge of the Plant.

If a non-communicative, vegetative art exists, we must rethink the very elements of our science, and learn a whole new set of techniques.

For it is simply not possible to bring the critical and technical skills appropriate to the study of Weasel murder mysteries, or Batrachian erotica, or the tunnel sagas of the earthworm, to bear on the art of the redwood or the zucchini.

This is proved conclusively by the failure—a noble failure—of the efforts of Dr. Srivas, in Calcutta, using time-lapse photography, to produce

a lexicon of Sunflower. His attempt was daring, but doomed to failure. For his approach was kinetic—a method appropriate to the *communicative* arts of the tortoise, the oyster, and the sloth. He saw the extreme slowness of the kinesis of plants, and only that, as the problem to be solved.

But the problem was far greater. The art he sought, if it exists, is a non-communicative art: and probably a non-kinetic one. It is possible that Time, the essential element, matrix, and measure of all known animal art, does not enter into vegetable art at all. The plants may use the meter of eternity. We do not know.

We do not know. All we can guess is that the putative Art of the Plant is *entirely different* from the Art of the Animal. What it is, we cannot say; we have not yet discovered it. Yet I predict with some certainty that it exists, and that when it is found it will prove to be, not an action, but a reaction: not a communication, but a reception. It will be exactly the opposite of the art we know and recognise. It will be the first *passive* art known to us.

Can we, in fact, know it? Can we ever understand it?

It will be immensely difficult. That is clear. But we should not despair. Remember that so late as the mid-twentieth century, most scientists, and many artists, did not believe that even Dolphin would ever be comprehensible to the human brain—or worth comprehending! Let another century pass, and we may seem equally laughable. "Do you realise," the phytolinguist will say

to the aesthetic critic, "that they couldn't even read Eggplant?" And they will smile at our ignorance, as they pick up their rucksacks and hike on up to read the newly deciphered lyrics of the lichen on the north face of Pike's Peak.

And with them, or after them, may there not come that even bolder adventurer—the first geolinguist, who, ignoring the delicate, transient lyrics of the lichen, will read beneath it the still less communicative, still more passive, wholly atemporal, cold, volcanic poetry of the rocks: each one a word spoken, how long ago, by the earth itself, in the immense solitude, the immense community, of space.

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## TREES



During his testimony on April 10, 2014, Manuin (Santiago Manuin Valera, the prominent Awajun-Wampis leader in the Amazonian lowlands of northern Peru) said:

*The government is taking away our territory, the territory of the Awajun-Wampis people, so that we become dependent on its [form of] development. The government never asked: Do you want to develop? They did not consult us. We responded: "Cancel the legislative decrees that affect our existence as a people." Instead of listening to our complaint, the government wanted to punish us - other peoples surrendered, we did not. The government ordered our forced eviction.*

The event is part of what I am calling the anthropo-not-seen: the world-making process through which heterogeneous worlds that do not make themselves through the division between humans and nonhumans - nor do they necessarily conceive the different entities in their assemblages through such a division - are both obliged into that distinction and exceed it.

Dating from the fifteenth century in what became the Americas, the anthropo-not-seen was, and continues to be, the process of destruction of these worlds and the impossibility of such destruction. It might very well represent the first historical apocalypse: the will to end many worlds that produced the one-world world and its excesses.

Scholars have discussed the Anthropocene as a transformation of humanity into a geological force capable of affecting, and possibly destroying, what we currently know as the world.

The anthropo-not-seen has been sustained since its early beginnings by a human moral force - and the unseen part of its destructive dynamic can be found in how this force has been considered constructive. Counterintuitively, this particle of the word (the not-seen) does not refer only to the anthropos - "the one who looks up from the Earth" - and is capable of destroying what refuses to be made in its image. Exceeding this destruction, the anthropo-not-seen includes more-than-human assemblages, both in the usual sense (i.e., that they may include humans and nonhumans), and in the

sense that these categories (human and nonhuman, and therefore species) are also inadequate to grasp such compositions, which as said above, may not become through these categories. The assemblages of the anthropo-not-seen may be translated as "articulated collectives" of nature and humans, yet may also express conditions of "no nature, no culture".

The antropo-not-seen was, and continues to be, a war waged against world-making practices that ignore the separation of entities into nature and culture and the resistance to that war. The antagonism was clear in the seventeenth century: Christian clerics walked the Andes from Colombia to Argentina and Chile "extirpating idolatries" that the friars conceived as "devil-induced worship." Extirpation required dividing entities into God-created nature (mountains, rivers, forests) and humans, and saving the soul of the latter. The invention of modern politics secularized the antagonism: the war against recalcitrance to distinguish nature from humanity silently continued in the name of progress and against backwardness, the evil that replaced the devil. Incipient humans became the object of benevolent and inevitable inclusion, enemies that did not even count as such. Until recently, that is.

— Marisol de la Cadena, **Uncommoning Nature**

<http://supercommunity.e-flux.com/authors/marisol-de-la-cadena/>



'God created and Linnaeus organised' – so quipped a colleague of Carl Linnaeus (1707–78), the Swedish pastor who introduced a new way of classifying plants and animals. Linnaeus made no life-changing discovery, and was often mocked as an ill-educated provincial boor. Nevertheless, he rapidly became celebrated as one of science's great heroes because he invented a revolutionary method for labelling plants that was easy to use. His new 'Language of Flowers' was, he boasted, so straightforward that even women could understand it. For the first time, botanical enthusiasts from all backgrounds could learn a simple way of identifying flowers – and his classification system is still in widespread use today.

The 18th century is often dubbed 'The Age of Classification', and Linnaeus was the classifier par excellence. By 1799, over 50 different systems were available, but Linnaeus's was the one that survived. In his *Geography of Nature*, he divided living organisms into different groups and subsets arranged in an orderly five-tier pattern of categories – classes, species and so forth. From now on, he said, every plant and animal should carry its own unique two-part label. Lemon trees, for instance, were called *Citrus limon* to distinguish them from their close relatives, orange trees, or *Citrus aurantium*. And Linnaeus also coined a new term to describe human beings – *Homo sapiens*, or wise man.

Because Linnaeus's system has been in use for over 200 years, it often seems that this way of classifying plants and animals must be the natural or right way to do it. But modern scientists are still arguing about its merits, and his scheme was enormously controversial when he first proposed it in 1732. Many of his rivals were trying to work out God's original blueprint for the universe, and they accused Linnaeus of choosing an arbitrary plan rather than one that was divinely ordained. He was also criticised for building an elaborate structure on the basis of relatively unimportant features. Earlier botanists had tried to group plants by characteristics such as the colour of their flowers or the shape of their leaves, but Linnaeus decided to order plants numerically according to their reproductive organs.

Surprising though it might seem, it had been nearly the end of the 17th century before naturalists realised that plants reproduce sexually. Even though many plants are hermaphrodites, which carry both male and female parts. However, many orders of plants had unequal numbers of stamens and pistils, and so could not possibly correspond to conventional marriages. Linnaeus described these unorthodox arrangements with words like 'concupine' and 'clandestine marriage'.

Linnaeus settled on this sexual dichotomy for organising the plant world. As his model for this supposedly objective system, Linnaeus turned to human relationships. The prejudices of Enlightenment Christian moralists are built right into the heart of this scientific plan for plants, which Linnaeus outlined by using romantic words such as 'bride' and 'marriage'. In his anthropomorphic scheme, the most basic division is between male and female – exactly the same distinction as in the highly chauvinistic society of late 18th-century Europe. Linnaeus gave priority to male characteristics; in other words, he imposed the sexual discrimination that prevailed in the human world onto the plant kingdom. His first level of ordering depends on the number of male stamens, but only the sub-groups are determined by the number of female pistils.

From the dominant position enjoyed by Linnaeus and his male contemporaries, this way of dividing the plant kingdom carried a huge advantage: it made his arbitrary organisation of plants appear as though it were natural, even God-given. Linnaeus had mapped human society onto the botanical world, but from then on men of science could argue in reverse. Since sexual hierarchies prevail in nature, male supremacy must also – so the distorted logic runs – be appropriate for people; this argument conveniently forgets how this sexual ordering was inferred from society in the first place. Through this closed loop, Linnaean classification not only mirrored social prejudice, but also reinforced it.

Paradoxically, the man who introduced eroticism into botany was a home-loving pastor who refused to let his daughters learn French in case they lost their appetite for housekeeping. He equated sexuality with marriage rather than promiscuity, and regarded women as wives and caregivers rather than as individuals with their own desires and ambitions. Linnaeus called plants in the first class monandria, from the Greek for 'one man'. He nicknamed his own wife a monandrian lily – a virgin with a single husband.

— **Patricia Fara, Sex, Botany & Empire, Icon Books, 2017**

<https://cup.columbia.edu/book/sex-botany-and-empire/9780231134262>



“We’ve learned a little about a few of them, in isolation. But nothing is less isolated or more social than a tree.”

“You and the tree in your backyard come from a common ancestor. A billion and a half years ago, the two of you parted ways. But even now, after an immense journey in separate directions, that tree and you still share a quarter of your genes. . . .”

“This is not our world with trees in it. It’s a world of trees, where humans have just arrived.”

“We found that trees could communicate, over the air and through their roots. Common sense hooted us down. We found that trees take care of each other. Collective science dismissed the idea. Outsiders discovered how seeds remember the seasons of their childhood and set buds accordingly. Outsiders discovered that trees sense the presence of other nearby life. That a tree learns to save water. That trees feed their young and synchronize their masts and bank resources and warn kin and send out signals to wasps to come and save them from attacks. “Here’s a little outsider information, and you can wait for it to be confirmed. A forest knows things. They wire themselves up underground. There are brains down there, ones our own brains aren’t shaped to see. Root plasticity, solving problems and making decisions. Fungal synapses. What else do you want to call it? Link enough trees together, and a forest grows aware.”

“I want to start a seed bank. There are half as many trees in the world as there were before we came down out of them.” “Because of us?” “One percent of the world forest, every decade. An area larger than Connecticut, every year.” He nods, as if no one paying attention would be surprised. “A third to a half of existing species may go extinct by the time I’m gone.” Her words puzzle him. She’s going somewhere? “Tens of thousands of trees we know nothing about. Species we’ve barely classified. Like burning down the library, art museum, pharmacy, and hall of records, all at once.” “You want to start an ark.” She smiles at the word, but shrugs. It’s as good as any. “I want to start an ark.” “Where you can keep . . .” The strangeness of the idea gets him. A vault to store a few hundred million years of tinkering. Hand on the car door, he fixes on something high up in a cedar. “What . . . would you do with them? When would

they ever . . . ?” “Den, I don’t know. But a seed can lie dormant for thousands of years.”

“The Greeks had a word, *xenia*—guest friendship—a command to take care of traveling strangers, to open your door to whoever is out there, because anyone passing by, far from home, might be God. Ovid tells the story of two immortals who came to Earth in disguise to cleanse the sickened world. No one would let them in but one old couple, Baucis and Philemon. And their reward for opening their door to strangers was to live on after death as trees—an oak and a linden—huge and gracious and intertwined. What we care for, we will grow to resemble. And what we resemble will hold us, when we are us no longer. . . .”

“Trees stand at the heart of ecology, and they must come to stand at the heart of human politics. Tagore said, Trees are the earth’s endless effort to speak to the listening heaven. But people—oh, my word—people! People could be the heaven that the Earth is trying to speak to. “If we could see green, we’d see a thing that keeps getting more interesting the closer we get. If we could see what green was doing, we’d never be lonely or bored. If we could understand green, we’d learn how to grow all the food we need in layers three deep, on a third of the ground we need right now, with plants that protected one another from pests and stress. If we knew what green wanted, we wouldn’t have to choose between the Earth’s interests and ours. They’d be the same!”

— **Richard Powers, *The Overstory*, Norton & Company, 2018**

## O

In September 1786 Johann Wolfgang von Goethe left Weimar to commence his Italian journey also with the idea to search for the Urpflanze, or the archetypal plant that he thought it would condense all the general forms of the vegetable kingdom (fig. 5). While in Sicily, he candidly wrote in his diary: "There must be such a plant, after all. If all plants were not moulded on one pattern, how could I recognise that they are plants?".<sup>8</sup> In 1790 Goethe published *The Metamorphosis of Plants*, the first book of natural morphology that influenced the whole Naturphilosophie and the first evolutionary biology, from Alexander von Humboldt to Jakob von Uexküll (not to mention the artworks of Ernst Haeckel and Karl Blossfeldt). The first lines of *The Metamorphosis of Plants* read: "Anyone who has paid even a little attention to plant growth will readily see that certain external parts of the plant undergo frequent change and take on the shape of the adjacent parts". Goethe continues: "In many plants we find that one node arises from another".<sup>9</sup> Goethe defined his procedure "genetic method", or a method for following the genesis of things. In Goethe the inner Gestalt of beings emerges to acquire genetic power and to grow autonomously. The lineage of German vitalism (that recognized often and tragically the purity of nature's life over human life) sprouted from the Urpflanze, a plant that did not exist. [...]

"We're tired of trees", wrote Giles Deleuze and Félix Guattari in the famous introduction on the rhizome to *A Thousand Plateaus* that is better to report in the original: "The Tree or Root as an image endlessly develops the law of the One that becomes two, then of the two that become four... Binary logic is the spiritual reality of the root-tree".<sup>13</sup> "We should stop believing in trees, roots, and radicles. They've made us suffer too much. All of arborescent culture is founded on them, from biology to linguistics. Nothing is beautiful or loving or political aside from underground stems and aerial roots, adventitious growths and rhizomes".<sup>14</sup> "Thought is not arborescent, and the brain is not a rooted or ramified matter... Many people have a tree growing in their heads, but the brain itself is much more a grass than a tree". Against the vertical tree form Deleuze and Guattari propose the horizontal rhizome form, that will become popular across the 1990s as a metaphor of the network society.<sup>16</sup> Deleuze and Guattari's own dichotomy between tree and rhizome will be overcome by information technologies themselves and specifically by the neural networks of artificial intelligence. Neural networks elaborate horizontal layers of data into consistent

patterns, that is by transforming a myriad of nodes into a Gestalt (McCulloch and Pitts invented them by observing the disposition of neurons in a frog's eye). Neural networks are able to turn rhizomic networks into the source of centralizing intelligence. The rise of global datacenters (and the new computational capitalism) indicates how the good old rhizome has been reversed into a new tree of power.

— Matteo Pasquinelli, *The Arborescent Mind: The Intelligence of an Inverted Tree*

<https://www.academia.edu/27431916>

○

*Landscape* is a deeply ambiguous term with a rich history. Many scholars see landscape as an ideological construct, a canonical standard of elite taste that might support capitalism or state control (Berger 1973; Cosgrove 1985). More recently, Kenneth Olwig (1996, 630) has reclaimed a substantive understanding of landscape as “a place of human habitation and environmental interaction” with particular legal, cultural, and economic histories. As Anna Tsing (2015) points out in *The Mushroom at the End of the World*, landscapes emerge through encounters between people and other beings, including soils, mushrooms, and disease organisms. In what follows I describe the kinds of landscapes and histories that emerge from encounters between people, trees, soils, and terraces in formerly cultivated landscapes in central Italy. Perhaps most important, this kind of landscape description pushes us to think about how particular forms emerge through encounters. Ontologies are transformed through partial relations between these beings, and the forms of plants and terraces offer clues to the biographies of particular organisms.

(...)

In the forests where I work in Italy, the capacities of particular chestnut trees to resist disease or to be grafted to produce fruit have given rise to tended trees, to linguistic classifications of these trees, and to an apparatus of law and property that protects the landscapes on which these trees live. Linguistic terms, practices of care, and the morphologies of trees constitute a dense empirical field. Words that describe enactments do not fully capture the material and imaginative surprises of the world and remain in a perpetually unstable relationship to what they denote. Strange ontologies are present in the mundane and the everyday, from my meetings with shape-changing chestnut trees to my wondering whether a tree stump I encountered was dead or alive to my experience of looking up to notice the landscape pattern of



flowering chestnut across a mountaintop. Carla Hustak and Natasha Myers's (2012, 97) formulation of *involutionary momentum* draws attention to the processes through which I became involved with plants, trees, and terraces, to the "affective push and pull among bodies, including the affinities, ruptures, enmeshments and repulsions among organisms constantly inventing new ways to live with and alongside each other." Trees, diseases, and terraces are relational ontologies (see Barad 2003) that compelled my attention and made me hesitate in disconcertment as I encountered beings that I can only partially describe. One method that is particularly suited to this experience of noticing the coming into being of perceptions through particular encounters is the use of drawings. A line gestures toward what mattered in a particular moment of perception when I noticed a partial relationship, and it explicitly relegates to the background what was not noticed or was not relevant to that encounter. In this practice of landscape ethnography, every perception is at once speculative, partial, and resolutely empirical. Noticing landscape features, trees, or soils takes a double form of wondering (*what is this thing that I am in relation with?*) and wonder at the mysteriousness and indeterminacy of the world, where our descriptions are always provisional and partial. Tim Ingold (2011, 2012) has long argued that material forms emerge from ecological relations in a world of process. I would add that the unending emergence of forms of language and noticing constitute an important empirical fact about what it feels like to be human in a world of process, where descriptions are never enough and where more words might come to be needed to sharpen our capacity to notice and describe. My own changing sensorium provided data for this essay, as did the fact that my perceptions are persistent, embodied, and yet unstable. Just as the descriptions of a particular organism are partial and tentative, so too are landscape descriptions partial and tentative and inhabited by many details not relevant at that level of perception. It is through a principled tacking back and forth between details and patterns that I learned to perceive new patterns and histories.

(...)

#### READING GHOSTLY PRESENCES IN FORESTS

Walking through the forests of the Monti Pisani with my botanist assistant Francesco Roma-Marzio, I note what tree, shrub, and understory plant species we see and what forms they have, jotting these down as sketches in my notebook, making notes of impressions and speculations. As a botanist, Francesco names understory plants for me, and the two of us provoke each other with stories of human use of landscapes. Drawing on my training as a forester, I tell him how the shapes of trees and shrubs tell me stories of tree cutting and regrowth, of fire and grazing. Echoes of conflicts over

property and landscape are present in tree form. Remnant ancient cultivated *castagneti* (chestnut orchards) tell us of centuries- long relationships with peasant agriculturalists who formerly sculpted chestnut, oak, and pine trees into the particular forms that produced food, timber, fodder, and fuel, while also providing pasture for sheep and goats (Puccinelli 2010; Giannini and Gabbrielli 2013; Squatriti 2013).

— **Andrew S. Mathews. Landscapes and Throughscapes in Italian Forest Worlds: Thinking Dramatically about the Anthropocene. University of California, Santa Cruz <http://orcid.org/0000-0002-6350-7533>**



I suggest there are more and more “nonsteads” in the modern world, instead of the homesteads. In worst cases, the places are ruined ecologically, or the people are uprooted and used for their market value. For now, I can only present a collection of the problematics of the nonstead, and in the end of this text, a couple of starting points of my work.

### **“Nonstead” - placeless places**

The horror novelist Marcin Morka has used “nonstead” in the novel title *Miasteczko Nonstead* (2012) as a name of the town where horrors take place, but to the best of my knowledge it has no other connotation or use before that. In my native tongue, Finnish, the word “epäseut” has already been used by poet Väinö Kirstinä (1936–2007) in year 1967 (my translation):  
"Kun mikään paikka ei enää / ole edes hyvän päivän tuttu. / On nopeita muutoksia, / paikattomia paikkoja epäseudulla; / viimeksi purettiin maamerkki tästä läheltä. / Se olipyöreä rakennus, / suuri kaasukello"

(When no place anymore/ is even a small talk acquaintance/ Quick changes prevail/ placeless places in the nonstead;/ last they took down a landmark just nearby / It was a round building, / a big gasometer)

Kirstinä's meaning is already the reflection of the change in the environment, although he seems to have a more nostalgic emphasis, longing after something familiar like the buildings in the past – but still reaching the issue of detachment from place. Combining the connotations of these uses, firstly the horrific and secondly the

deconstruction of the relation of human being to the environment, I suggest the use of "nonstead".

### **Artistic non-sites and urban non-spaces**

Land artist Robert Smithson was first to present and discuss "non-sites" at the end of the 1960's. He conceptualized the relationship between the actual site where the artwork material was collected, the site described in a map, and the material brought in a gallery as an artwork; a metaphor of the actual site. Smithson introduced the duality and connection of two, even very distant, places.

According to anthropologist Marc Augé, "non-spaces" are places where human beings remain anonymous, such as supermarkets, highways, roadsides or other common places where faceless contractual obligations replace human interaction (Augé 1995, 94 as cited in Moran 2005). Moran presents further, that these places are sites of cultural politics. Supermodern environments such as highways offer an experience of timeless, placeless movement, a routine of sitting in a vehicle and the practical necessity of existing while hovering between two places. Seemingly, they are not places of attachment or interaction. But as Moran's examples show, service stations that are placeless to some, can offer a place of culture and identity to others, and also the development of highways, roundabouts and new towns can have political importance (Moran 2005, 94-128).

### **Wastelands and -seas**

The plastic that we use, has already crumbled into our nutrition. Also the collected waste is problematic, since the problems are shipped away from sight. The culture and luxury of today will be the waste heap or plastic island of the future. (E.g. Wilson 2017). The space for growth is taken over by strange elements that do not take part in the cycles of changing energy.

### **Forming nonsteads: politics, wars and ruins**

Many of the ruining processes start from conflicts. Traces of imperial power that keep on living, whether we try to erase the scars or not. In "Imperial Debris - On Ruins and Ruination", several authors give their account on the aftermath of colonialism and attempts "to track the uneventemporal sedimentations in which imperial formations leave their marks". The book follows the imperial processes and tries to bring forth the layers of imperial debris, both material and psychic. (Stoler et al. 2013)

In *A Biography of No Place* (2003), historian Kate Brown describes the history of current Chernobyl zone, which was also once known as "krezy"; borderland that was

ethnically, religiously and linguistically more varied. The Ukrainian-Polish-Jewish-German borderline was a war zone in civil war and Polish-Soviet war, and suffered also from the Second World War. The area was a place of heavy ethnic purifications carried out by states and ideologies of imperial Russia, socialist Soviet Union, fascist Nazi Germany, Parliamentary Poland and Nationalist Ukrainian parties. The modernising, standardizing “progress” of the twentieth century was carried out radically in the area. It was also about the border between different religious and also communist and capitalist ideas. Brown argues, that the histories of the peripheral places like the “krezy” have been silenced. The debris and failures of the century are also in this place. (Brown 2003,1-5)

The example of the “krezy” shows also how the area of current radioactive pollution also had a long history of conflict and vulnerability. It was a matter of decades of oppressive power structures that were harming the area before the catastrophe.

### **Homestead changing into nonstead**

In the area I used to think of my homestead, a pristine, big Finnish cape has been given to Russian nuclear company Rosatom. It is situated at the Baltic Sea, at basin of the Bothnian Bay between Finland and Sweden, in Pyhäjoki municipality. State-governed nuclear company Rosatom operates also the infamous Maiak and is urging nuclear projects in Finland as well as in many other countries (Rosatom Newsletter, 2015, and numerous news articles documents this). Nevertheless Finnish politicians responded to Russian pressure, and gave green light to permit stages after the decision in principle, despite the fact that in every assessment there are fundamental ecological, ethical, geopolitical and economical grounds for dismissing. Writer Sofi Oksanen said in her essay that was widely spread in Finnish newspapers, about Finlandisation, silence and self-censorship: Finns learned to react instinctively to Soviet pressure, and it is still considered bold to criticise Russia publicly and so people have learned to censor themselves. (Oksanen 2017). One of the financial problems is, that private investors want to get out of the project, even through a court decision, and municipal electric companies and state-owned Fortum are keeping the project at the what some consider, artificial, “national ownership”.(eg. Ainola 2015, and Nikkanen 2015)

### **Heavily contaminated areas**

In her book “Plutopia” (2013), Brown researches two of the most heavily contaminated areas in the world, plutonium cities of Richland in the United States and Ozersk in Russia. The cities were built to put up and support Hanford and Maiak plutonium

plants. Citizens were given prosperous conditions, but the workers were not told about the health risks of the operations, nor were the communities that were right outside or under the radioactive wind of the places. The areas will be contaminated for such a long time, that we cannot even understand the biological or financial consequences yet. Brown describes, for example, how the process of creating these cities went on, how the research was conducted in secrecy and how the safety of people had no value in the pressure of creating plutonium for warfare (Brown, 2013). These two cities were similar in many ways, they were created, excluded and guarded nuclear zones, "zones of immunity", where "... plant managers were free to run up budgets, embezzle, conceal accidents, and, most ominously, pollute. Soviet engineers in the Urals followed the American experience of dumping waste quickly and cheaply underground and into local rivers and pumping radioactive gases skyward. Over the years, plant operators struggled with many accidents; some were massive, such as the 1957 blast at the Maiak plant, but most spills were routine and intentional. As operators dumped, radioactive particles joined air currents, filtered in to drinking water, and flowed down rivers." (Brown 2013,6)

Brown presents several techniques globally used by the nuclear industry: the insufficient and limited research on the radiated areas, such as has happened in Chernobyl and Japan (Brown 2013,332-333), the relativisation of the radioactive contamination, for example comparing it to background radiation (Brown 2013, 333), neutralizing by naturalising – such as saying zones like Chernobyl are full of wildlife, though in even moderately contaminated areas considerable part of birds are sterile or deformed (Brown 2013,333-334).

### **Total exclusion, negative space**

The aesthetics of sculptor Teo Eng Seng's artworks "D Cells" were born at the end of the 1980's when the artist's sister, Teo Soh Lung, a lawyer in Singapore, was a political prisoner and the artist himself worked in England. Soh Lung was imprisoned first without a trial for four months and later kept in prison for two years for issuing a joint press statement defying the governments allegations of conspiracy and claims that the persons detained were well treated. The artworks are small plaster sculptures made referring to the detention cell that the artist's sister was confined in: the void or plan of the cell as a negative space. The absent cells do more than describe a content, they depict the anxiety, condensed and abstracted anger, an accusation of totalitarian power and suggest the absence of complete truth. The pieces are made of gypsum, brushed with silver paint and rubbed with black shoe polish, printed void lines of the cell plan. (Tan 2014,141-159)

In the works, presented ugliness for the visibly unpleasant subject grasps political force (Tan 2014,147). The rugged objects that the prison cell structure is printed on, lack the figure of justice that traditional Chinese good luck charms (Tan 2014,151-153). The cell artworks present an abstract kind of a non-space, and bring visual understanding to unimaginable conditions and injustice. Their physical form needs to be ugly, and refer rather than present, because it is also suited for what a place like that is - when a person is nothing, out of society, in the ultimate nospaces to them. Teo Soh Lung did not belong to prison, nor does any political prisoner today. And everyone whose close people have been in prison, understands the pain Soh Lung's brother captivated in his works.

### **Plants to the rescue?**

Because of the state of the environment and the history that has created our position in the world, I am turning towards the plant world to find help for the mentioned problematics. The recent interest in plants, both in artistic and scientific research, has given a lot of basis to work from. Philosopher Michael Marder has presented interested ideas based on "plant philosophy", their intelligence or appreciation of them, for example, seeing the peaceful, renewing and growing perseverance of the Occupy movement of people as something similar to plant life. (Marder 2011).

I have started to work on the depiction of plants, but how to attune oneself with plants or nature in general, in a way that abandons the mentioned ways that create one dead end after another? Preceding existence of gesture or action before language or image is one of the arguments to practice techniques from environmental dance. It can enable to better listen to the natural phenomena and to respond to ecosystems. It seems to be possible to find answers to current questions through different somatic practices, bodily movement and practice. Practitioners from various backgrounds (dance, yoga, nature meditation) suggest regular practice in movement, breathing and meditation (both in natural and cultural settings) and many see beneficial the active attempt to listen, to be present in nature and act in an ecologically sound manner, also including the food we consume. (See e.g. Stone, 2015)

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— **Tiina Prittinen, Nonstead as a Setting**



Beeches, spruce, and oaks all register pain as soon as some creature starts nibbling on them. When a caterpillar takes a hearty bite out of a leaf, the tissue around the site of the damage changes. In addition, the leaf tissue sends out electrical signals, just as human tissue does when it is hurt. However, the signal is not transmitted in milliseconds, as human signals are; instead, the plant signal travels at the slow speed of a third of an inch per minute.<sup>4</sup> Accordingly, it takes an hour or so before defensive compounds reach the leaves to spoil the pest's meal. Trees live their lives in the really slow lane, even when they are in danger. But this slow tempo doesn't mean that a tree is not on top of what is happening in different parts of its structure. If the roots find themselves in trouble, this information is broadcast throughout the tree, which can trigger the leaves to release scent compounds. And not just any old scent compounds, but compounds that are specifically formulated for the task at hand.

This ability to produce different compounds is another feature that helps trees fend off attack for a while. When it comes to some species of insects, trees can accurately identify which bad guys they are up against. The saliva of each species is different, and trees can match the saliva to the insect. Indeed, the match can be so precise that trees can release pheromones that summon specific beneficial predators. The beneficial predators help trees by eagerly devouring the insects that are bothering them. For example, elms and pines call on small parasitic wasps that lay their eggs inside leaf-eating caterpillars. As the wasp larvae develop, they devour the larger caterpillars bit by bit from the inside out. Not a nice way to die. The result, however, is that the trees are saved from bothersome pests and can keep growing with no further damage. The fact trees can recognize saliva is, incidentally, evidence for yet another skill they must have. For if they can identify saliva, they must also have a sense of taste.

A drawback of scent compounds is that they disperse quickly in the air. Often they can be detected only within a range of about 100 yards. Quick dispersal, however, also has advantages. As the transmission of signals inside the tree is very slow, a tree can cover long distances much more quickly through the air if it wants to warn distant parts of its own structure that danger lurks. A specialized distress call is not always necessary when a tree needs to mount a defense against insects. The animal world simply registers the tree's basic chemical alarm call. It then knows some kind of attack is taking place and predatory species should mobilize. Whoever is hungry for the kinds of critters that attack trees just can't stay away.



Trees can also mount their own defense. Oaks, for example, carry bitter, toxic tannins in their bark and leaves. These either kill chewing insects outright or at least affect the leaves' taste to such an extent that instead of being deliciously crunchy, they become biliously bitter. Willows produce the defensive compound salicylic acid, which works in much the same way. But not on us. Salicylic acid is a precursor of aspirin, and tea made from willow bark can relieve headaches and bring down fevers. Such defense mechanisms, of course, take time. Therefore, a combined approach is crucially important for arboreal early-warning systems.

Trees don't rely exclusively on dispersal in the air, for if they did, some neighbors would not get wind of the danger. Dr. Suzanne Simard of the University of British Columbia in Vancouver has discovered that they also warn each other using chemical signals sent through the fungal networks around their root tips, which operate no matter what the weather. Surprisingly, news bulletins are sent via the roots not only by means of chemical compounds but also by means of electrical impulses that travel at the speed of a third of an inch per second. In comparison with our bodies, it is, admittedly, extremely slow. However, there are species in the animal kingdom, such as jellyfish and worms, whose nervous systems conduct impulses at a similar speed. Once the latest news has been broadcast, all oaks in the area promptly pump tannins through their veins.

Tree roots extend a long way, more than twice the spread of the crown. So the root systems of neighboring trees inevitably intersect and grow into one another—though there are always some exceptions. Even in a forest, there are loners, would-be hermits who want little to do with others. Can such antisocial trees block alarm calls simply by not participating? Luckily, they can't. For usually there are fungi present that act as intermediaries to guarantee quick dissemination of news. These fungi operate like fiber-optic Internet cables. Their thin filaments penetrate the ground, weaving through it in almost unbelievable density. One teaspoon of forest soil contains many miles of these "hyphae." Over centuries, a single fungus can cover many square miles and network an entire forest. The fungal connections transmit signals from one tree to the next, helping the trees exchange news about insects, drought, and other dangers. Science has adopted a term first coined by the journal *Nature* for Dr. Simard's discovery of the "wood wide web" pervading our forests. What and how much information is exchanged are subjects we have only just begun to research. For instance, Simard discovered that different tree species are in contact with one

another, even when they regard each other as competitors. And the fungi are pursuing their own agendas and appear to be very much in favor of conciliation and equitable distribution of information and resources.

— Peter Wohlleben, *The Hidden Life of Trees*, Ludwig Verlag, 2015.



... ‘We are now closer to understanding how ecosystem parameters can be guided by key players in the system to maximize benefits for the life-chances of whole species. In essence, there is a form of ‘natural justice’ that prevails. We now know that, for example, health in all forest ecosystems is regulated by what are called “[mother trees](#)” that control fungal networks that in turn interconnect trees of varying ages. The control system works to regulate nutrient flows to trees, such as to the very young, that need them most ([Simard et al 2015](#)). It also works to transfer information and energy from dying species to those that might continue to thrive, thus maintaining ‘the forest’ (see [Frazer 2015](#)). These crucially important insights have yet to be incorporated into ecological thinking applied to politics and human societies.

Given that forest ecosystems are foundational for most life on Earth, including humans, the so-called ‘wood-wide-web’ is now a prime example of natural justice and the attempt to maintain ‘balance’ or total homeostasis in nature where the early insights of Kropotkin in *Mutual Aid* (1902) find contemporary scientific validation. Cooperation and mutual aid can now be reinstated as an evolutionary foundation of life and crucial for all aspects of human enterprise.’

...

### **Imagining The Symbiocene**

‘Let us now try to imagine The Symbiocene and the politics of how it might function. The new era will be characterized by human intelligence that replicates the symbiotic and mutually reinforcing life-reproducing forms and processes found in living systems. Given that we have evolved as a species within the pre-existing evolutionary matrix, such intelligence lies within us as latent potential. The elements include, full recyclability of all inputs and outputs, the elimination of toxic waste in all aspects of human enterprise, safe and socially-just renewable energy and full and harmonious integration of human industry and technology with physical and living systems at all scales.

However, beyond biomimicry we must also have symbiomimicry. Many simply think it is enough to copy the shapes and form of life, but they make no connection to life’s processes. We don’t just

copy the form of life, we replicate in all types of human creativity, the processes of life that make the mutually beneficial associations between different life forms strong and healthy. Examples such as the ‘wood-wide-web’ suggest to me that organizing resources and processes so that the young, weak and vulnerable get their fair share in order that the totality has the greatest chance of survival and flourishing is fundamental to life. Symbiomimicry in human enterprise will both generate and distribute resources such that, in nurturing all humans, we nurture the life support system on which we all depend.’

...

### **Conclusion**

During a relatively short period of human history we have seen the emergence of a growth-addicted industrial-technological society that has achieved its success at the expense of the vitality of the Earth. At the same time as this system has produced global scale pollution, negative climate change, mass extinction and human wealth, it has impoverished and corrupted many of the efforts that have been made to emerge into some sort of harmony or equilibrium with the Earth. The usurpation by a powerful elite, and their instruments such as mass media, of concepts like democracy, sustainability, sustainable development and resilience have all taken place within my lifetime (62 years).

Rather than rehabilitate these now well-abused concepts, I believe it is time to create some new ones; concepts that are urgently needed and very hard, if not impossible to corrupt. The Symbiocene, sumbiocracy and symbiomimicry are all offered in this spirit. Indeed, I can offer one more neologism that might help. E.O. Wilson (1984), and before him, Erich Fromm (1965), gave us the concept of ‘biophilia’ as something to hope for in human nature. Our instinctual love of life and life-like forms would/could prevail over necrophilia and possible ecocide. However, although ‘bio’ means life, it is often seen in the context of a reductionist science that pulls things apart and isolates particularities. I now offer ‘sumbiophilia’ (the love of living together) as an addition to biophilia. Since we evolved within the pre-existing ecological matrix where humans as an intensely social species lived in relative harmony with all other life forms, sumbiophilia must also be deeply ingrained within us. If I am correct, then exiting The Anthropocene and entering The Symbiocene will be a deeply satisfying experience for most humans. As the politics of Sumbiocracy play out and we live with symbiomimicry in all our technologies and habitats, the Earth will breathe a huge sigh of relief.’

— **Glenn Albrecht. Exiting the Anthropocene and entering the Symbiocene. 2017.**

<https://glennaalbrecht.com/2015/12/17/exiting-the-anthropocene-and-entering-the-symbiocene/>



terra0 is a self-owned forest; an ongoing art project that strives to set up a prototype of a self-utilizing piece of land. terra0 creates a scenario whereby a forest is able to sell licences to log trees through automated processes, smart contracts and Blockchain technology. In doing so, this forest accumulates capital. A shift from valorization through third parties to a selfutilization makes it possible for the forest to procure its real exchange value, and eventually buy (thus own) itself. The augmented forest, as owner of itself, is in the position to buy more ground and therefore to expand.

From an economic perspective, an object cannot be separated from its purpose or function. Thus the means of existence of every object is based on its usability by third parties. terra0 examines a scenario whereby objects appropriate and apply utilisation mechanisms to themselves, with the help of new technologies. A forest has an exactly computable productive force; the market value of the overall output of the forest can be precisely calculated. Beside its function as a source of raw material, the forest also holds the role of service contractor. It produces not only wood, but serves as a protected space within which diverse species can survive, contributing to an overall ecological balance. Furthermore, it offers space for relaxation. The terra0 project creates a scenario whereby the forest, augmented through automated processes, utilitises itself and thereby accumulates capital. The augmented forest is not only owner of itself, but is thus in the position to buy more ground and therefore to expand. In the first phase of the project, a piece of ground is bought by the project initiators, and a smart contract is drawn up. The smart contract contains all contractual definitions from terra0 and passes of two parties: the human actors as a project initiators, and a representation of the forest as a so-called nonhuman actor (or 'NHA'). The bought ground is signed over to the NHA in exchange for debentures (later referred as terra0 tokens), which represent a stake of the project and the smart contract. At this stage, the forest owns itself, yet is indebted to its shareholders (the project initiators). An economic model implemented in the smart contract controls the exploitation of the forest. The NHA sells licences to log certain trees. If a certain sum of money has been earned via selling these licenses, the NHA starts to repay its debts to Paul Seidler, Paul Kolling and Max Hampshire, the project initiators by buying its terra0 tokens back. Once repayment is complete, the original owners (the project initiators) hold no more tokens, thus the forest is the sole shareholder of its own economic unit. The forest, in economic terms, controls itself. By appropriation of

capitalist and cultural mechanisms, a piece of ground thus plays an active role in society, whilst at the same time avoiding direct influence by third parties, via removing the possibilities of economic interaction by them. terra0 can be seen thus as a prototype of an economic unit in a post-human future.

Blockchain technology and smart contracts enable nonhuman actors to administer capital and therefore to claim the right to property for the first time. Property is discussed now as something which is not separable from a natural or legal entity. terra0 begins in this legal grey area, originating in the technological change brought about with the invention of blockchain technology and smart contracts. Since an individual's property is protected in accordance with their rights, one would assume that objects which have gained the right to property are entitled to similar personal rights as natural persons.

Everything that humans themselves affect and produce is defined as an aspect of culture (from the Latin 'cultura': treatment, or care), whilst nature is defined as everything else, i.e. that which is by itself, simply 'as it is'. However, the natural can only be described via cultural technologies, like art and science. The concept of 'nature' thus takes, as a demarcation, a function in the cultural apparatus and cannot be separated therefore from it. Nature is influenced directly and indirectly by society, and is defeated therefore by its logic of utilisation. In a society whose existential basis relies on a capitalist logic of utilisation, there is no good case to believe that nature (as something which is originally given, and therefore depriving itself from any utilisation) still exists. If culture is understood as the counterpart to nature, by which one recognises nature's 'otherness', then nature must be conceptualised not as being spatially separated from humans, as the person opposite oneself is, but instead as immanent within culture.

In the paper are defined some criteria for defining an autonomous decentralized agent:

- I. The agent earns enough money to maintain itself, without human intervention (e.g. the agent pays for its own server space).
- II. The agent has an adaptive feedback system.
- III. The agent can replicate itself.
- IV. When interacting with humans the agent does so as a peer, not as a tool.

Vitalik Buterin described different levels of complexity, ranging from single purpose agents (computer viruses) to AI-like agents using evolutionary algorithms to discover

and enter new industries. These points can thus be added to the previously outlined criteria for defining an autonomous decentralized agent:

- I. The agent behaves much like a simple biological organism.
- II. The agent can react and adapt to its environment (and furthermore, gather and process information about this environment).
- III. The agent evolves through evolutionary algorithms and can thus discover new survival strategies.

It is possible to realise the project in different ways, best understood as realisations on different levels of complexity.

*Lowest level of complexity:* A smart contract on the Ethereum Blockchain controls the in- and outputs of the forest. Every six months a programme fetches satellite pictures of the property from a supplier outside of the Blockchain. With the help of self-written image-analysis software, the programme can determine how much wood can be sold without overly-diminishing the tree population.

*Middle level of complexity:* The smart contract carries out all calculations itself and is no longer dependent on programmes outside of the Blockchain. Furthermore, the contract can scrape databases in order to dynamically regulate its prices.

The contract thus recognises which trees are most profitable, and therefore only sell, or grow, specific types of trees in order to maximise profit.

*Highest level of complexity:* The smart contract is no longer distinguishable from a completely developed artificial intelligence. Scraping data from forest databases allows the forest to radically optimise itself through logging decisions. Due to this, the wood is now sold at highest possible price.

The project is divided, both technically and in terms of content, into two phases: a crowdsale-phase, and a run-phase.

In the first (crowdsale) phase, two smart contracts are created: The first contract regulates the crowdsale. If the contract receives ether, it returns terra0 tokens to the sender. These tokens can be viewed as a form of debenture, which can be sold back to the second contract at a later date. The crowdsale-phase ends after the pre-agreed time interval stated in the contract. The accumulated capital is then made available to the project initiators.

The second (run) phase then begins. This phase consists of the second smart contract, a forest analysis programme hosted on a server, an Oracle, and the Ethereum clock beginning the active phase of the project. The programme selects the satellite view of the forest via its GPS coordinates, before determining the number, state, and age of the trees located on the NHA's property using OpenCV. This data is shown as a publicly

accessible JSON File. The Oracle accesses the website once every six months, and reflects the data as a smart contract in the Ethereum Blockchain. Periodically, the Ethereum clock activates the smart contract which accesses the Oracle's data. The first contract is very similar to the standardised crowdsale contract. The second contract administers the in- and outputs of the forest, and further serves as its real 'owner'. It functions as an automated trade centre for tokens. The contract defines two different tokens:

*terra0 token* function as a debenture. The token can be acquired only during the crowdsale phase and represents a share of the property of the smart contract. The *terra0* token can be sold to the contract by its owner for Ether.

*The Woodtoken* is created by the initialisation of the contracts, and remains as a stock with the contract, and is acquired from the contract in exchange for Ether. The *Woodtoken* can be seen an agreed amount of wood that can be harvested in the process of self-aquisition.

There are countless ways to capitalise on a forest. The forest can serve as a recreational site, as a source of value for a neighbouring town, or habitat for animals and threatened plants. The overall value of a forest grows with its age. However, trees that are too old no longer contribute to this potential profitability, on the basis of their susceptibility to illness. The proportion of the trees that are allowed to be cleared is adjusted so that a certain rate of growth, or constant tree population is guaranteed. Old, unprofitable trees are felled in order for the forest to remain healthy, as well as allow for younger trees to grow. Thus a situation arises whereby the production rate of the wood remains as high as possible, without decreasing the forest population.

— **Paul Seidler, Paul Kolling and Max Hampshire. *terra0* - Can an augmented forest own and utilise itself? May 2016. Berlin University of the Arts, Germany**

<https://terra0.org/>



"";"dID";"Gemeente";"Ontwikkelingsfase";"Bestandstype";"Bedrijfsvorm";"Leeftijdsklasse";"Mengvorm";"Sluitingsgraden";"Textuurklasse";"DRAINAGE";"drainering Zand (ZSP)"

[EN: ID, Commune, Phase of Development, Type of file, Commercial Form, Age, Mix form, Degrees of Closure, Class of Texture, drainage Sand]

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"";"dID";"BOOMNR";"BOOMSORT";"Boomsoort";"HOOGHOUT";"DOOD"

[EN: ID, Nr of Tree, Species of Tree, species of tree, Highwood, Dead]

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"283";"plot\_26";48;52;"Corsicaanse den";124;20;29;7;0;0;1;5;0,0067  
"284";"plot\_26";49;52;"Corsicaanse den";126;67;36;7;0;0;1;5;0,0103  
"285";"plot\_26";50;52;"Corsicaanse den";133;3;26;7;0;0;1;5;0,0054  
"286";"plot\_26";51;52;"Corsicaanse den";133;51;26;7;0;0;1;5;0,0054  
"287";"plot\_26";52;52;"Corsicaanse den";126;86;25;7;0;0;1;5;0,005  
"288";"plot\_26";53;52;"Corsicaanse den";137;65;28;7;0;0;1;5;0,0062  
"289";"plot\_26";54;52;"Corsicaanse den";144;64;29;7;0;0;1;5;0,0067  
"290";"plot\_26";55;52;"Corsicaanse den";148;32;29;7;0;0;1;5;0,0067  
"291";"plot\_26";56;52;"Corsicaanse den";150;78;23;7;0;0;1;5;0,0042

"292";"plot\_26";57;52;"Corsicaanse den";156;48;35;7;0;0;1;5;0,0097  
"293";"plot\_26";58;52;"Corsicaanse den";156;63;29;7;0;0;1;5;0,0067  
"294";"plot\_26";59;52;"Corsicaanse den";163;33;24;7;0;0;1;5;0,0046  
"295";"plot\_26";60;52;"Corsicaanse den";166;81;23;7;0;0;1;5;0,0042  
"296";"plot\_26";61;52;"Corsicaanse den";179;20;33;7;0;0;1;5;0,0087  
"297";"plot\_26";62;52;"Corsicaanse den";179;37;26;7;0;0;1;5;0,0054  
"298";"plot\_26";63;52;"Corsicaanse den";169;67;36;7;0;0;1;5;0,0103  
"299";"plot\_26";64;52;"Corsicaanse den";170;84;39;7;0;0;1;5;0,0121  
"300";"plot\_26";65;52;"Corsicaanse den";174;70;30;7;0;0;1;5;0,0072  
"301";"plot\_26";66;52;"Corsicaanse den";185;77;34;7;0;0;1;5;0,0092  
"302";"plot\_26";67;52;"Corsicaanse den";190;25;33;7;0;0;1;5;0,0087  
"303";"plot\_26";68;52;"Corsicaanse den";188;82;33;7;0;0;1;5;0,0087  
"304";"plot\_26";69;52;"Corsicaanse den";198;78;35;7;0;0;1;5;0,0097  
"305";"plot\_26";70;52;"Corsicaanse den";213;67;40;7;0;0;1;5;0,0127  
"306";"plot\_26";71;52;"Corsicaanse den";214;39;30;7;0;0;1;5;0,0072  
"307";"plot\_26";72;52;"Corsicaanse den";215;47;31;7;0;0;1;5;0,0076  
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"310";"plot\_26";75;52;"Corsicaanse den";219;73;25;7;0;0;1;5;0,005  
"311";"plot\_26";76;52;"Corsicaanse den";219;18;31;7;0;0;1;5;0,0076  
"312";"plot\_26";77;52;"Corsicaanse den";220;82;26;7;0;0;1;5;0,0054  
"313";"plot\_26";78;52;"Corsicaanse den";230;47;25;7;0;0;1;5;0,005  
"314";"plot\_26";79;52;"Corsicaanse den";230;57;29;7;0;0;1;5;0,0067  
"315";"plot\_26";80;52;"Corsicaanse den";244;78;30;7;0;0;1;5;0,0072  
"316";"plot\_26";81;52;"Corsicaanse den";246;59;27;7;0;0;1;5;0,0058  
"317";"plot\_26";82;52;"Corsicaanse den";247;49;47;8;0;0;1;6;0,0176  
"318";"plot\_26";83;52;"Corsicaanse den";254;78;33;7;0;0;1;5;0,0087  
"319";"plot\_26";84;52;"Corsicaanse den";258;30;40;7;0;0;1;5;0,0127  
"320";"plot\_26";85;52;"Corsicaanse den";260;59;24;7;0;0;1;5;0,0046  
"321";"plot\_26";86;52;"Corsicaanse den";266;51;25;7;0;0;1;5;0,005  
"322";"plot\_26";87;52;"Corsicaanse den";269;78;30;7;0;0;1;5;0,0072  
"323";"plot\_26";88;52;"Corsicaanse den";280;75;33;7;0;0;1;5;0,0087  
"324";"plot\_26";89;52;"Corsicaanse den";281;33;32;7;0;0;1;5;0,0081  
"325";"plot\_27";0;12;"Berk";271;21;96;22;0;10;1;11,5;0,0733  
"326";"plot\_27";1;12;"Berk";271;21;73;19,5;0;6;1;14,5;0,0424  
"327";"plot\_27";2;1;"Zomereik";306;75;37;12;0;2;2;9;0,0109  
"328";"plot\_27";3;12;"Berk";325;77;28;9;0;0;2;6;0,0062

"329";"plot\_27";4;51;"Grove den";353;42;58;12,5;0;9;1;9,5;0,0268  
"330";"plot\_27";5;12;"Berk";2;50;46;10,5;0;0;2;2,5;0,0168  
"331";"plot\_27";6;12;"Berk";14;33;26;7;0;0;2;3;0,0054  
"332";"plot\_27";7;12;"Berk";17;77;71;17;0;0;1;10,5;0,0401  
"333";"plot\_27";8;12;"Berk";30;89;61;16;0;0;1;11;0,0296  
"334";"plot\_27";9;12;"Berk";34;65;29;10;0;0;2;6,5;0,0067  
"335";"plot\_27";10;12;"Berk";36;61;68;20,5;0;0;1;17,5;0,0368  
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"337";"plot\_27";12;12;"Berk";85;36;62;17,5;0;0;1;7;0,0306  
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"339";"plot\_27";14;16;"Lijsterbes";147;90;46;10,5;0;6;2;9;0,0168  
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"341";"plot\_27";16;1;"Zomereik";159;69;59;17;0;3;1;11;0,0277  
"342";"plot\_27";17;1;"Zomereik";240;25;32;4,5;0;0;2;3;0,0081  
"343";"plot\_27";18;1;"Zomereik";242;37;142;20;0;0;1;2,5;0,1605  
"344";"plot\_27";19;1;"Zomereik";113;122;125;21,5;0;0;1;14;0,1243  
"345";"plot\_27";20;1;"Zomereik";198;180;150;18;0;0;1;8,5;0,179

— **Instituut voor Natuur- en Bosonderzoek (INBO), Data on the trees in the neighbourhood**