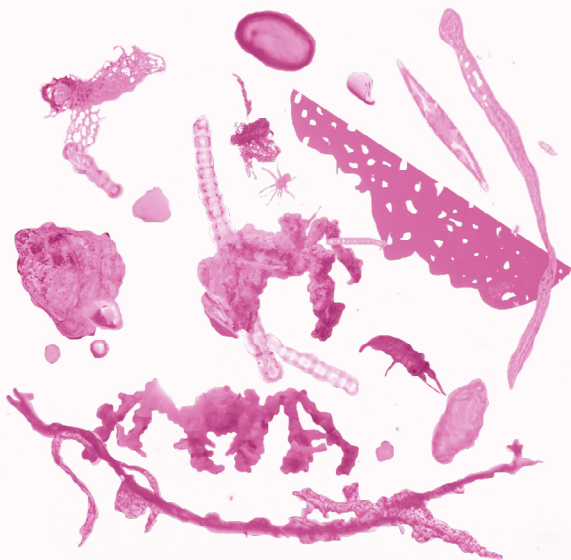


MADREPORA

BY ELIZABETH BURMANN LITTIN





to my mother and my grandmother,

MADREPORA

Elizabeth Burmann Littin
Providence, Rhode Island, 2020.
MFA Thesis, Sculpture Program RISD.
© 2020 Elizabeth Burmann Littin

TABLE OF CONTENTS:

ACKNOWLEDGMENTS	VI
ABSTRACT	VIII
≈. bacteria: <i>masters of the world</i>	1
	
OUTWARDS	11
≈ ≈. hidrologia: <i>to fluid forward</i>	13
	
DUST*	27
≈ ≈ ≈. aquaria; <i>porous mother</i>	29
APPENDIX	41

Thanks:

ALWAYS to my family and their
unconditional porous and amorous support



to the transoceanic love and
companionship of Ives



to the complicity of my friends,
especially —the beloved— Celine and
Sergio



Emily for sharing her house with me, which
soon felt as my shell and home



Ben Gagliardi from the Nature Lab
helped me in becoming an experimental
aquarist



Jianni Tien for streaming her
subterranean thoughts with me



to my cohorts of the
Sculpture Master Program
at Rhode Island School of
Design.



ABSTRACT

Exploring materiality and how we're inextricably entangled with it, this thesis dive into bodily, aqueous, and political engagements for dissolving the human project of separating nature from culture and bodies from environments. This dematerialization practice driven by discursive means has served as an excuse for the industrial exploitation and abuse of the less seen.

Infused by the material turn in feminist theory, I propose to think-with materiality in all its wet, slimy, and dusty ongoingness as a way to craft from the living and dying processes that we embody as current wanderers among contamination, scarcity, and ruins.

Proposing a conceptual move, from the surface to the muddy bottom, I embark a submersion between folds of biological and historical depth. Recalling our common bacterial past, I start with Lynn Margulis's symbiotic theory of cell evolution and the porous dynamics of interaction among bodies, species, and environments through the concept of "trans-corporeality" developed by Stacy Alaimo.

Descending from the microbial perspective of evolution, I extend my analysis into the vastness of the modern sea and the scattered sources of freshwater of the planet. By casting the ocean as the water's depth, and freshwater as the commodification of this medium/material, I point out in how ignoring the agency of watery assemblages -and of nonhuman subjects in general- has been a major obstacle for creating a common ecological awareness and sensibility that allows us to coexists in more sustainable and ethical ways.

Being drifted by transformative and non-hierarchical flows, I channel my stream of thoughts and pour them into a vessel for microbial, chemical, decorative, and multispecies collaboration. This artificial and biotic environment is an aquarium, my particular aquarium tank located in my studio at Rhode Island School of Design, and which I argue is not just a miniature representation of the sea, but a reflection of our daily interaction as porous beings embedded within an environment that bathes on the impacts of our material actions.

≈ Bacteria: *masters of the world*



Since there is always a cavern in the cavern, each body, however small it may be, contains a world insofar as it is perforated by uneven passageways. —Gottfried Leibniz, *The Monadology*.

Imagine that billions of years ago, life wasn't hard. It was viscous, aqueous, and soft in its becoming.

Warm and shallow, the primeval ocean was the material mantle that comforted the bed for organic arrival. Immersed in this ancient bath, cyanobacteria or blue-green algae absorbed light and expelled it back in the form of oxygen (fig.1). Their oxide breath spread, reaching concentrations high enough to fully cover and tenderize the anaerobic atmosphere making it breathable for more-than-just-them.

In these same conditions, bacteria dwelled in a trans-corporeal¹ broth of interactions. By crafting entanglements of non-singularity, bacterial communities participate in constant flows of genetic interchange; by eating or being engulfed, they share their genetic information with floating bacteria and their other prokaryote siblings, the archaea.

By adapting or adopting features, the new acquisitions become part of the mutated cells. It was during these porous encounters, around 2 billion years ago, that the non-nucleated structure of bacteria's prokaryotic cells evolved into cells with nuclei, giving origin to the unit that evolved into the rest of living forms that are not themselves: animals, plants, fungi and protists. Evidence of this

¹ Stacy Alaimo put together the term Trans-corporeality to explain the permeability of bodily entities and the porous boundaries between the environment, human and non-human bodies within the unruly substances that are constantly moving across them. As a post-humanist and feminist concept, trans-corporeality recognizes the material agencies of bodies in an extensive manner, pointing out the impact that everyday actions and human routinary activities—such as daily consumerism—have on human and non-human

symbiotic evolution is found in the prokaryotic DNA of mitochondrias (fig.2) inside *our* eukaryotic cells².

Lynn Margulis (fig.3), whose ideas I have drawn from and rephrased above, was an evolutionary theorist whose work as a biological storyteller brought together the symbiogenesis theory of evolution: genes evolve through symbiotic interactions with other organisms and cells by networking and cooperation, not, as established views would have it, from fitness and survival.

To put it simply: the symbiogenesis theory tells the story of a bacterial cell that consumed another cell and instead of digesting it, left the cell to reproduce inside it. Over time the hosting cell and the transitory symbiont became the same organism; this cell within a cell passed over generations through cellular division, setting the conditions for the evolution of more complex forms of life. In animal cells, the mitochondria appeared when the consumed cell adapted to live in an oxygen-rich environment, while in vegetal cells chloroplast emerged when the absorbed cell was able to be photosynthetic. Both organelles, mitochondria and chloroplasts contain their own DNA of demonstrated bacterial origin, and without them the cells wouldn't be able to synthesize the energy necessary for all cellular activity: i.e., the creation of tissues within organs within systems within organisms.

Margulis's ideas confronted the status quo interpretation of Neo-Darwinism, arguing that it distorted Darwin's original theory of evolution. Neo-Darwinist thought merged the concept of natural selection with Mendel's posterior genetics research into a super-theory: "the new synthesis" was based on competition and selfish struggle between genes and species, where only particularly "fit" and "dominant" features persist over generations.

Symbiogenesis, on the other hand, breaks down the idea of organisms as individuals that transcend and instead, understands the porosities of becoming a being. By revealing our common microbial past as multispecies creatures, the hypothesis of symbiotic evolution was and still is a radical disclosure that dismantles the paradigm of human exceptionalism.

² The endosymbiotic theory of evolution of the eukaryotic cell, proposed by Margulis in the 60s, suggests that mitochondria were once a free-living organism of bacterial characteristic. The similarities between prokaryotic cells (bacteria) and Mitochondria has given evidence to support this idea among the scientific community: both bacterium and mitochondrion have cell membranes with their own circular genome and reproduce by binary fission -unlike eukaryotic cells-. It also has been discovered that the genome of mitochondria is inherited maternally, which has led to the idea in human genetics of the existence of a "Mitochondrial Eve", an african woman and common mother between all humans. Maybe then, the mother of the mitochondrial Eve was a bacterial mom?

As we examine ourselves as products of symbiosis over billions of years, the supporting evidence for our multimicrobe ancestry becomes overwhelming. Our bodies contain a veritable history of life on earth. Our cells maintain an environment that is carbon- and hydrogen-rich, like that of the earth when began. They live in a medium of water and salts like the composition of the early seas. We became who we are by coming together of bacterial partners in a watery environment (Margulis & Sagan 1998, 18)

Our multibiotic becoming is, then, more than just random successful data in our genetic records. It is an interaction that we experience in its ongoingness, at all scales, as we're inextricably engaged with the materialities of the world. To be multitudes is to be more-than-aggregates of independent living forms, it is to belong to their material pasts and experiences too. As bodies, there's no way to be isolated. Quarantine doesn't exist. We're embedded in the environment, and the ionic composition of our blood and the alkaline liquid that surround our cells are telling us that an ancient sea stream inhabits us. To acknowledge our collective being-ness is to be aware that we cultivate in our guts what our ancestors—watery animals that migrated to the land—swallowed from the mud. We're secretions of a web, where environment, human, non-human, living and dying matter come together.

Margulis's microbial thoughts are a biological threat for the Anthropocene, a virulent infection to the human pursuit of purity that claims domination as a species. The bacterial perspective of evolution reveals, ironically, that despite the human history of ownership over "other" bodies and "outer" environments, we're all undeniably colonized. We serve as the land and body for others to shape and inhabit and with them we constitute an inseparable us.

Science might have created the belief/relief that as with macro forms of nature, we have mastered the minuscule and we own the knowledge of pure *nothingness* as well. As a consequence of the vicarious methodology of making the unseen visible, the technological mediation and specialization of scientific labor have relegated the contact with the microcosmos to be an exclusive feature of their field. By holding academic authority, Natural sciences have framed and classified life through their microscopes, cases, petri dishes, and taxonomy templates. Nevertheless, their reductive lenses do not show the natural history nor the material stories of bacteria, that as Margulis said, before human existence was even a possibility, "invented all", and for ages have been composing and decomposing every bit of matter around. This material task is a microscopic labor that is not invisible but *beyond vision*.

Perhaps, understanding the framing interaction with microorganisms in labs as a channel for expanding human sight and material awareness,

rather than a way to access “objective truth,” can open possibilities to recover excluded ways of knowing and create alternatives: transdisciplinary understandings of biology that are more able to connect with the multiple perspectives of being and experiencing the world.

Recognizing the agency of the unseen —or, rather, the *more-than-visible*, as a spectrum beyond human vision as we know it— muddles the social construction of the religious, cartesian and capitalist body, pulling it back to its biological and radical materiality as a living *assemblage*. In her book *Bodily Natures*, Stacy Alaimo crafts a critique of the dematerialization of contemporary theory, arguing that “the linguistic turn” has shaped feminist theory to focus exclusively on the discursive aspect of “the body” as a cultural production. She argues that even when the disentangling of *women* from *nature* aimed to dissolve the moralist concept around that bond, as a tie that disregarded the social construction of gender, by doing so, the discursive approach in feminist theory has ironically distanced bodies from nature and accentuated dualisms such as nature/culture.

To confront this dematerialization crisis, Alaimo proposes to merge with nature and expose the “nonsense” of biological determinism, by engaging in a material feminism that embraces the material agencies of the body through trans-corporeality. By fostering a material turn in feminist theory that takes account of human and non-human beings, trans-corporeality honors what has been historically dismissed by the *anthropos*. “Imagining human corporeality as trans-corporeality, in which the human is always intermeshed with the more-than-human world”. (Alaimo 2008, 238)

Trans-corporeality is a flow across the boundaries by which the human has been understood as specie, going through the cultural norms and gender restrictions that have signified human bodies. It recognizes our multispecies becoming not as a fixed event, but as a permanent transformation that we should envision for practicing “a posthuman environmental ethics in which genetics, evolution, and environment are imbricated in and affect the emergence as well as the unraveling of the human” (Alaimo 2010, 3)

The intermeshing movement of trans-corporeal bodies evokes the mingled viscosity of prehistoric seas, where first bacteria entangled themselves unfolding various natures. When I perceive my body as a trans-corporeal figure, it makes me think that we’re still bathing there. We aren’t in the shallow anymore, but among many layers of terrestrial decay and oceans of fleshy depth.

To think with the collaborative aspects of symbiosis within a transcorporeal body can be a transformative political gesture if their senses of cohabitation are applied to the dynamics of social interaction.

The awareness of our porous commonality can serve to dismantle the hierarchies of what it’s wanted/worth to be seen according to the power structures embedded in service of an instrumental idea of nature, and by which corporeal experiences have been constrained disregarding their materiality.

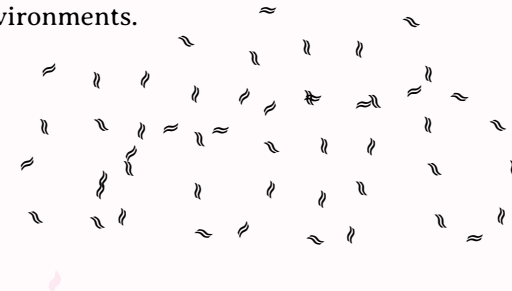
Recognizing the collective labor in which we’re involved with an array of visible and more-than-visible companions might be a kindly way of starting performing kin and developing awareness for decentering the human and practicing more ethical ways of coexistence.

top layer salt, second layer green, you see this? Second layer green, cyanobacteria, masters of the world, the cyanobacteria. Is the highest level of evolution. Why? Because they live off carbon dioxide, plentiful available. They live off sunlight as the source of energy, plentiful available, from the very beginning. Water, and that's all. That's all. (Symbiotic Earth 2017, 1:08:48)

This quote comes from a video where Lynn Margulis unfolds her storytelling through a layer of mud. There she appears holding a fragment of a microbial mat that she cut and grabbed from the ground. Describing the piece as a carpet colored by pink and green bacteria that is a sample of a complex bacterial network, she explains how the first forms of life thrived from precarity, collaboratively creating biological richness and variety from what was available.

While I follow her dirty slime-covered fingers theorizing and gesticulating about the origins of life, I start to wonder what it means to seriously embrace materiality? It is not to fear filthy hands? Searching now out of the screen, I start to think: what can this even mean for us, here on the edge of a pandemic, as we all of a sudden encounter trans-corporeality by force, and the awareness of the more-than-visible becomes the biggest risk. In a letter sent on April 15th, 2020 to American citizens, the White House claims to be waging a war with an “invisible enemy”. Can we declare war on our ontological vulnerability? I prefer to think of it as an embodied reminder that our individuality is merely the tension with our material fragility, and that we always interact along lines of precarity.

We're woven together through shared liquidity, bodily fluids and uncertain environments.





REFERENCES

≈ Alaimo, Stacy, *Bodily Natures: Science, Environment, and the Material*, Indiana University Press, 2010.

≈ Alaimo, Stacy, Hekman, Susan, *Material Feminisms*, Indiana University Press, 2008.

≈ Braidotti, Rosi, Hlavajova, Maria, *Posthuman Glossary*, Bloomsbury Academic, 2018.

≈ Feldman, John, Film: *Symbiotic earth: How Lynn Margulis rocked the boat and started a scientific revolution*, 2017.

≈ Margulis, Lynn, Sagan, Dorion, *Microcosmos: Four Billion Years Of Evolution from Our Microbial Ancestors*, University Of California Press, 1998.

I F (

my body is a folded ocean

I WANT TO UNFOLD MYSELF

I WANT TO BE A DRIFTER AGAIN.

AN OCEAN WANDERER,

SUCH AS PLANKTON,

plastics bits,

A FLOOD OF FLESH SUBMERGING INTO THE MASS

WHERE EACH PART IS EVEN GREATER THAN THE WHOLE,

to be the medium and unfold me on it.

AND BE FED BY THE CURRENT OF DEBRIS.

LEAVE MY PIECES

TO DISSOLVE,

I WANT TO S T R E A M MY THOUGHTS

THROUGH THE TRANSFORMATIVE MATERIALITY OF WATER

≈. Hidrologia: to fluid forward



Like a pearl diver who descends to the bottom of the sea, not to excavate the bottom and bring it to light but to pry loose the rich and the strange, the pearls and the coral in the depths, and to carry them to the surface, this thinking delves into the depths of the past- but not in order to resuscitate it the way it was and to contribute to the renewal of extinct ages. What guides this thinking is the conviction that although the living is subject to the ruin of the time, the process of decay is at the same time a process of crystallization, that in the depth of the sea, into which sinks and is dissolved what once was alive, some things “suffer a sea-change” and survive in new crystallized forms and shapes —Hanna Arendt, *Illuminations*.

Entering the ocean as an onto-epistemological place, and sensing water as the *medium~matter~material* that informs the multiple embodiments of the sea, my wet imaginaries will spell the ocean as the water’s depth.

To engage with the ocean is to be keen to descend to and see below the mirroring surfaces of culture; it is to dive outside the membranes that protect our chimeric interior. It is to drill on the skin-shells that encase our salty cells preventing them from drifting apart and being tadpoles again. In this dispersion/immersion, I want to moisten the soil of the geo, earthly, and human-centered imaginaries and make them muddy, to re-shape our naturalcultural entanglements from a material basis.

No longer being a slimy flat soup, the contemporary sea is the folding of ages, a material *continuum*. Its depth is built between pleats of bodies; overlapping myriads of living creatures, fossil materials, organic leftovers, pulverized skeletons, and the more recent abundance of human debris and industrial waste. As living ruins, these materials cement over each other, becoming part of environmental entanglements, such as seamounts, fathomless bottoms, reefs, ocean caves, sand plateaus, abyssal volcanoes, islands of trash, and rocky meeting points with terrestrial beings on the shores, which ecological variety raises from the spill-over effect of a permanent interlaced contamination¹.

¹ In *The Mushroom At The End Of The World*, Anna Tsing leads us through the journey of matsutake mushroom picking, a labor that operates outside economic regulation, and entangles human labor with the agency of the mushroom. Matsutake is considered a culinary delicacy that grows in zones of forests damaged by human disturbance. Tsing conceptualizes the resilience of the mushroom to grow from the ruins of human activity as an ability of natural and cultural interactions to create diversity from precarious conditions and through contamination (Tsing, 2017).

The abyssal creatures are ultimately dependent upon the slow rain of dead plants and animals from above. Every living thing of the ocean, plant and animal alike, returns to the water at the end of its own life span the materials that had been temporarily assembled to form its body. So there descends into the depths a gentle, never-ending rain of the disintegrating particles of what once were living creatures. (Carson, 1937, 324)

As a result of collective decay and growth, the ocean troubles the human idea of nature as a source of virginal matter, and of water as an element for moral purification. The sea is heavy water, thick, viscous, a density made out of living and dying processes. Shaped by multitudes, the sea is a multispecies environment where, like our transcorporeal bodies, new possibilities are generated from collaboration. Its substance and movement is able to propagate, dissolve, amalgamate, and blend materials, conditioning a place for radical transformation that collapses our normative concepts of dominance, hierarchy, and human exceptionalism.

Astrida Neimanis proposes *thinking-with water* as an intimate practice that agitates and swirls our watery substances, and can function as a method for reminding us of the transient materiality of our bodily experience. Gaston Bachelard, with a more symbolic approach, dedicates the essay “*Water and Dreams*” to the evocative powers of water for material imagination. Conjuring water as a medium between life and death, Bachelard connects the images created by liquid dreams with the human ontological bond with materiality. “A being dedicated to water is a being in flux. (it) dies every minute; something of (its) substance is constantly falling away.” (Bachelard 2006, 6)

Channelling our aqueous being-ness, as if was a piece of collective memory sunk in the unconsciousness that we want to bring to the surface, à la Jung, could be a worth-to-try therapy for developing more sensitive and empathic attitudes towards non human entities. Regardless of the plenty speculations that can be elaborated about our primeval bonding with the ocean and the possible uncanny triggers below it, it is no secret that the main component of our bodies is water, and rather than a silent symptom, this is a daily and active performance. As Neimanis wrote “We embody the hydrological cycle” (Neimanis 2017) and we reveal our liquid existence through our pores, holes and gladules when we exude, cry, pee or soften food to eat.

To think and imagine with water is a de-centering descent that might flush away Western mirages of material permanence and modern projects of progress that rely on nature's objectification. Water rejects our will to possess and conquer it, and its state is one of permanent changeability. Therefore, the disruptive and unexpected ways of water seem to be the

best movements to mimic and outface the current dematerialization crisis and its consequently abusive practices. Thus, I think that is not casual—rather part of el caudal—that the global wave of social manifestations that emerged in 2019 in China, Chile and Lebanon have embodied a liquid performability, by being leaderless movements, characterized by non-hierarchical ways of operating, and whose demands pursue a horizontal distribution of resources and equal conditions for living together.

It is not rhetorical then, but material, that Hongkongers have taken and spread the Bruce Lee slogan “be water my friend”² as a tactic to disperse collective bodies around the city, by leaking when they encounter the police, and reemerging somewhere else to make social manifestation possible despite repression —encountering as water, a crack, a crevice, a slit, a hole, to fluid forward. This liquidity isn't just choreographic; it is also present in the decentralized modes of communication protesters use for solving their immediate needs and collective agreements.

Hongkongers coordinated their strategies through group chats, report their new movements via AirDrop, and alert the police's location through customized apps. They privileged the use of bitcoin and cash, as a way of disrupting digital banking tracking channels. They offered public light shows with laser pointers to deactivate surveillance cameras, dropping drones and creating a confusing environment hard to navigate for the police. Furthermore, they fought back weapons with the properties of water, and along the protests it's seen how people are always carrying bottles of water that they use for disabling tear gas bombs by being poured over the cartridges as well as for calming their chemical effects. Water is a care companion, in Hong Kong and elsewhere.

Learning from each other and adapting to the hostile circumstances each protester protects the collective using whatever is in their reach to diminish what Judith Butler has called “induced forms of precarity” (Butler 2015, 11) that have been imposed over mistreated bodies by systematized abuse and state violence.

In Chile, millions of people have been protesting since October 18th, 2019. Termed ‘Chile's social outbreak,’ this uprising has been filling the streets all over the country's length, reclaiming public space as a commons. While physical mobilization is its most notorious shape, the movement has found ways of communicating remotely, by propagating memes that call out abuse and spread demands until they become viral. It has vibrated into communal waves of sound while deprived of freedom by offering nighttime serenades of banging pots during curfew and it has

² “Be formless, shapeless like water. Now you put water into a cup, it becomes the cup. You put water into a bottle, it becomes the bottle. You put water into a teapot, it becomes the teapot. Now water can flow or it can crash. Be water my friend.” Bruce Lee in *The lost interview*, The Pierre Berton show, 1971.

brought people together, whose accumulated silence broke the distance between them and feverishly burst into a common claim for dignity by any means

When out in the streets, this multitudinous assembly is sometimes referred to as the “mass of people” but also as the “sea of people”. I argue though, that these two terms are not interchangeable. While the figure of the mass envisions a homogenous conglomerate, the sea, *el mar de personas*, acknowledges the agency of every body, of each identity, which, by manifesting their own will, gathers to be part of an oceanic web of intertwined collaboration across difference.

Furthermore, the concept of a mass in its contained form misses a crucial aspect of the social protests in Chile and elsewhere: it doesn't consider the environment, which contains not only the pre-existing surroundings (the public space, the street, a particular city), and the imposed repressive conditions (military and police fences, state restrictions, tear gas, water cannons, risk of injuries and human rights violation). It also excludes the transient environment crafted by the protester's march (fluctuations of the collective mood, waves of rage, webs of empathy, the quaking celebration and the humiliating fear, a complicit pact of shared precarity and exposure anyways), which, like the sea, crashes into and floods everything and at the end of the day rolls back into individual forms that stay committed to breaking together again and again. This tidal force refused to stop. It kept rising “until dignity becomes a habit.” However, while threats like curfew, media manipulation or bodily mutilation couldn't stop the Chilean social outbreak, another outbreak—the inescapable and trans-corporeal outburst of COVID-19— put its *mar~ching* protest on lockdown until further notice.





In this way, water, and watery bodies, are subjects in permanent rebellion; they adapt, leak, get solid, or escape as vaporous beings. Their resilience is not defeat; it is resistance. And while they can temporarily lack form, their materiality doesn't go away.

When forms, mere perishable forms and vain images —perpetual change of surfaces— are put aside these images of matter are dreamt substantially and intimately. They have weight; they constitute a heart. (Bachelard 2006, 1)

Sustaining moisturized hearts can pump ways to treat water better and dissolve the human project of nature's heartless exploitation. Unfortunately, the unmanageability of water and the uncertain borders of the sea has caused an ambiguity towards creating international laws for ocean preservation, and the old navigation claim of a *Mare Liberum*³ didn't give any freedom to the ocean. Quite the opposite: this doctrine totally disregarded marine agency in favor of channeling the flux of its most beloved current: currency.

The contemporary notion of oceanic freedom, which often draws on a pre-industrial imaginary, is not so different from impunity. As an excuse for committing abuse, the

idea of the sea belonging to all, continues to thrive in an institutional frame that follows the old codes of piracy. The sea has been the object of systematized forms of violence, through extractionism and overfishing, non-regulated ocean mining, and the enormous amounts of anthropogenic residues that are expelled into the water every day. Sea trash has become part of the ocean's biota, and digesting plastic by their beings —and by us humans when consuming seafood— is now part of the ever growing variety of the contaminated world⁴

The bottomless imagina-

³ Under the doctrine of *Mare liberum*, international waters or high waters (those parts of the sea out of territorial waters, which correspond to 2/3 of the ocean) don't belong to any state. *Mare liberum*-The Free Sea refers to a book of international law published by Hugo Grotius written while on service to the Dutch East India company. The law was written in response to the Portuguese and Spanish claims of possession of the high seas which restricted foreign access and trade. Grotius uses as arguments the limitlessness of the oceanic waters, its inability to be occupied and therefore possessed, but more importantly he argues that the right of sail and trade on the sea are undeniable principles —unlike industry— given by nature “there are some things which every man enjoys in common with all other men, and as there are other things which are distinctly his and belong to no one else, just so has nature willed that some of the things which she has created for the use of mankind remain common to all, and that others through the industry and labor of each man become his own” (Grotius tr. Van Deman, 1916)

⁴ This is the case of bivalves, common shellfish present on human diet, such as clams, oysters, mussels, scallops, which are filter feeders. That means that in order to get their food they filter and clean large amounts of water, and by doing so absorb plankton, suspended particles of organic debris, algae, but also impressive amounts of microplastic and ocean pollution According to

ry of the ocean has probably helped to craft the idea of the sea as an endless dump, yet the cumulative effect is seen in the slow death of marine ecosystems, devastation of which reflects not just the ocean's damage, but that of the entire planet. It was also not coincidence but corroboration of the awakening power of marine materiality, that the geological community only agreed to date the Anthropocene, after noticing the ghostly signals of coral bleaching due to ocean warming and acidification⁵. The sea can no longer be considered a passive receptacle where human detritus falls into obscurity. Today, the sea must be understood as a sensorium of planetary health, or death, as the case may be.

The ocean, out of daily habit, absorbs the carbon dioxide that terrestrial activities produce. It takes responsibility and puts out fires for actions beyond itself. Bacteria dwelling in the sea don't just break down the CO₂ we throw into the atmosphere, but also decompose the oil from ocean mining to prevent the poisoning of entire ecosystems. Bacteria on duty consume greater amounts of oxygen, affecting the reproduction of plankton and algae, the same algae that symbiotically protect corals. Without their velvety coat corals bleach, and the reef's inhabitants die from this deprivation from shelter and food. This is *The Drama of the Ocean*, that as Elisabeth Mann Borgese announced, is unfolding its many pleat textured by greenhouse gas. (Mann Borgese, 1975)

Damaging water is a bodily abuse, and its cascading effects embody several forms of social injustice:

And again, these are ecological questions, but they are also feminist, and anti-colonial. This is because the harm that we do to water is never equally distributed across human bodies. The flows of biomatter also chart the flows of global power. (Neimanis 2012)

Pointing out the mistreatment of bodies of water can lead us to identify the rooted abuse towards “otherness”, in which all non-human agents, such as “natural sources”, or even worse “renewable resources” like rivers, seas, air, soil,

a study of Brunel University London around 70 particles of microplastic were found in every 100 grams of mussels. While one oyster can filter up to 5 lt of water per hour, mussels can filter around 25 lt on one day. Recently oysters and mussels reefs have been reconstructed in order to clean estuaries and repair damaged ecosystems such as NY harbor. See *Billion Oyster project*.

⁵ In *Staying with the trouble*, Donna Haraway, reckons the first usages of the term Anthropocene, first coined in 1980 by the ecologist Eugene Stormer, but making a star appearance in the 2000 by Paul Crutzen, when the proposition of changing of geological epoch because of the magnitude of human impact on earth was finally welcomed by using as argument the evidence “that the acidification and warming of the oceans are rapidly decomposing coral reef ecosystems” (Haraway, 2016, 40)

are exploited past their point of collapse. This undermining also leaks between humans entities, and manifest through the hegemonic inequity and the historical displacement of native communities from lands rich on “resources” or the scarcity of water in rural zones of the global south, where the availability of water—and rarely clean one—is not a priority nor an economic interest for the companies, that most of the times not even in national managing, find that a damaging loop is the most profitable way of business.

Freshwater, on the other bank, hasn’t embodied the same paradigms of “freedom” given to the ocean’s vastness, or “unconquerable” romanticism and mystery due to marine depth. Sweet water, scattered around the planet, has suffered in plain sight. Translucent, humble, kind, sheer, has been fully submitted to human and industrial purposes. Targeted as an eternal fountain, it is a vital source that lacks the recognition of its agency, considered a domestic good.

The liquid metaphors of the market hurtfully coincide when it comes to the administration of freshwater. In Chilean water regulation, these are not just analogies, but the literal modus operandi: a market of water distribution truly exists (Mundaca, 2012). As a legacy of the 1981 dictatorial constitution—the same constitution that cemented Chilean Neoliberalism, a “miracle” devised in the labs of Milton Friedman at the University of Chicago’s department of economics—the access to water in Chile is private, and its price is regulated by the market’s flow. This makes it one of the few countries in the world where water is not a social right, but capital. Not a commons, but a commodity. The only right provided by the state law is the possibility of participating in the free market, and buying access or paying for its use to the private owners of water: transnationals, mining companies and agro-exporters.

If water is not a commons, under a optimistic view, it could protect it from what Patricia Yaeger calls “the tragedy of the commons” (Yaeger 2010) allowing governments to have more control over water, tracking its use and setting tight regulations—and sanctions—to ensure its preservation and equal distribution among communities. This is not the Chilean scenario. Chile’s territory is drying, and water is stolen from the very high affluents of La Cordillera de los Andes to the underground layers of telluric depth and redirected to technagrarian purposes.

From this massive removal only 8% is for people’s consumption⁶ and all the rest is sucked by the

⁶ The report Atlas del Agua done in 2016 estimated that 82% of the total water available in Chile is used by the agricultural sector, while a 7% for the industry, 3% minery and the 8% left is for drinking water and sanitary services. At the same time the distribution of water rights correspond to a 95.7% to private companies, while 4.3% belongs to the state and municipalities. The owners of water rights don’t have to pay for them because they were given by the state as a concession. In the case of agricultural companies, they don’t even have to pay taxes. (Dirección General de Aguas, Ministerio

agricultural industry, mainly for export. Chilean extreme extractivism, and the liquidity, or let’s say the gassy neoliberalism of its economy, has drained the territory and today is facing the most critical drought in history: a megadrought. Chilean moisture has been shipped out and inhabits avocado toast and iPhone lithium batteries (Webb, 2019) around the globe. It is crystal-clear, *tan claro como el agua*, that this is an evident emergency for the lands and its inhabitants. Over the last year, many now-deserted fields have served as writing boards that proclaim “no es sequía es saqueo” - “it isn’t drought, it’s looting.” (fig.6 & 7)

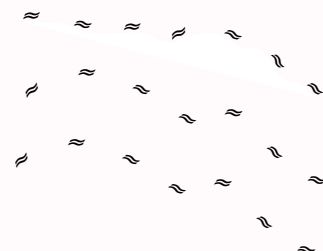
This lack of empathy towards bodies of water is not exceptionalist, it is a tabula rasa that violates human and non-human rights: The transformation of water into capital forces us to ask: what type of waters are able to be commodified and how far—or closely intimate— can get the privatization of the material of being live?

The hydrological crisis not only depends on global scale measures and can’t rely on old political promises. It must be a more-than-human alliance and embrace the micro and macrocosmos within. A water ethics can be developed intimately, on a body-scale, starting from the circulation of empathy from our own blood, as it delivers hydration to our brains, thinking and making by waving our watery bodies while knowing we’re mitochondrially entangled with the sea, and our survival depends on salt and sweet streams. To be kind to water is to create alternative ways of distributing not just resources, but the vital agency of water between all aqueous beings.

Watery imaginations can unearth the systems of abuse, and flood them away, displacing the geo-centric extractivism that has perpetuated the devastation of the less-seen. To join the aquatic turn is to smooth and slow down, cool and calm the thermal rush. To be like water, is to rebel, to be sensitive with the most minimal, like the sentient drifters that we were once. Because we should know, water awakened us, and with the tide rising everyday, we’re wandering again, into an increasingly watery future.⁷

de Obras Publicas, 2016; Universidad Diego Portales, Informe Anual de Derechos Humanos en Chile, 2017

⁷ In Submarine Futures of the Anthropocene Elizabeth Deloughrey suggests that because of the effects of climate change we’re experiencing the reduction of our distance with ocean’s materiality “The ocean drives our global climate, and due to sea-level rise our planetary future is becoming more oceanic. Sea level as the most visible sign of planetary change, connecting all the earth surface. The Anthropocene has catalyzed a new oceanic imaginary in which, due to the visibility of sea level rise, the largest space on earth is suddenly not so external and alien to human experience.” (Deloughrey 2017, 34)



REFERENCES

≈ Benjamin, Walter, and Arendt, Hanna, *Illuminations*, Mariner, 2019 [1955].

≈ Butler, Judith, *Notes Toward a Performative Theory Of Assembly*, Harvard University Press, 2018

≈ Carey-Webb, Jessica, "Water is a Right: The parallel COP in Chile," 2019. <https://www.nrdc.org/experts/jessica-carey-webb/water-right-parallel-cop-santiago>

≈ Carson, Rachel, "Undersea", *Atlantic monthly*, September 1937, 322-25.

≈ Deloughrey, Elizabeth, *Submarine Futures of the Anthropocene*, *Comparative Literature*, 2017.

≈ Direccion General de Aguas, *Atlas del Agua*, Ministerio de Obras Públicas, 2016.

≈ Grotius, Hugo, tr. Van Deman, Ralph, *Mare liberum; The freedom of the sea, or The Right which belongs to the Dutch to take part in the East Indian Trade*, New York: Oxford University Press, 1916. [1609]

≈ Haraway, Donna, *Staying with the Trouble: Making Kin in the Chthulucene*, Duke University Press, 2016.

≈ Hessler, Stefanie, *Tidalectics Imagining an Oceanic Worldview Through Art and Science*, Tba21-academy, 2018, 157-162.

≈ *Informe Anual sobre Derechos Humanos en Chile 2017*, Ediciones Universidad Diego Portales, 2017.

≈ Neimanis, Astrida, Chen, Cecilia, and MacLeod, Janine, *Thinking with Water*, Mcgill-queen's University Press, 2013

≈ Mann Borgese, Elisabeth, *The Drama of the Oceans*, New York: H.N Abrams, 1975.

≈ Mundaca, Rodrigo, *La Privatizacion de las aguas en Chile viola los Derechos Humanos*, CIPER, 2012. <https://ciperchile.cl/2012/02/17/la-privatizacion-de-las-aguas-en-chile-viola-los-derechos-humanos/>

≈ Neimanis, Astrida, *Bodies of Water: Posthuman Feminist Phenomenology*, Bloomsburry Publishing, 2017

≈ Neimanis, Astrida, *Thinking-with water*, Degree Convenor, Gender Institute, London School of Economics Talk given at "Entanglements of New Materialisms" Linkoping, Sweden, 2012.

≈ Neimanis, Astrida, "We are all bodies of water", essay https://www.academia.edu/509800/We_Are_All_Bodies_of_Water

≈ Tsing, Anna, *The Mushroom At the End Of the World: on the Possibility Of Life in Capitalist Ruins*, Anna Tsing, Princeton University Press, 2017.

≈ Lee, Bruce, "Bruce Lee: The lost interview", The Pierre Berton show, 1971.

≈ Yaeger, Patricia, *Editor's Column: Sea Trash, Dark Pools, and the Tragedy Of the Commons*, Pmla, 2010.

dust*

madrepora

DID YOU TASTE THE KINSHIP OF THE SALTY ANCESTRY

AND REFRESH THE MEMORY WITH THE SWEET MOISTURE?

IS NOT ENDLESS

NOT ANYMORE, NOT THAT I KNOW.

F_L ^A BUT ALSO DIVE.

DEEP

deepest

AND

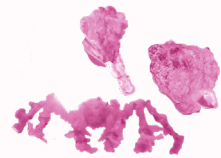
THERE,

AGAIN

FIND YOU,

the dust* turned into mud

≈ ≈ ≈. *Aquaria: porous mother*



This is an ecology inspired by a feminist ethic of 'response-ability' in which questions of species difference are always conjugated with attentions to affect, entanglement, and rupture; an affective ecology in which creativity and curiosity characterize the experimental forms of all kinds of practitioners, not only humans

*—Donna Haraway, *Arts of Living on a Damaged Planet.**

An aquarium is a biotic environment artificially produced by a combination of ammonia, bacteria, and human acts of care. A methodical chemical artistry is required to start a culture within an aquarium, first to generate the biological possibilities for successful interactions and then to monitor and adjust its chemicals to maintain a healthy balance. Once these disparate elements have settled down the cycle takes on its own self-sustaining agency, resulting in a multispecies environment in which processes of living and dying are intimately entangled.

These entanglements are helped along by non-purifying but nitrifying bacteria who transform food waste into ammonia. Nitrosomonas bacteria then convert the ammonia into nitrite to be shared with the colony of nitrospira fellows that will break them down into nitrates. By this thread of sharing, the nitrogen cycle breaks down the toxicity of animal excretions into a nitrogen compound that is harmless for aquatic animals and algae life (fig.9). This process happens over and over, everytime that (certain) human hands feed the non-human companions that inhabit a domestic aquarium. If the subjects being cared for happen to be crustaceans, their food can be mussels, clams, oysters and scallops. These bivalvia creatures trigger labors of material transmutation by being digested and expelled by the animal and metabolized by the bacteria colonies. (Burmann and Tien, 2019)

The stability dream of the aquarium requires a dynamic of control and surveillance, that, according to my observations of the conversation on aquarium-focused web forums, many passionate aquarists try rigorously to achieve. This is not how I relate to my aquarium. While embarking on the journey of maintaining an aquarium over the last several months, I have experienced, more than anything, my inability to dominate and

fully comprehending the material agency of its components. Events such as the unexpected blooms of all different kinds of plankton, a rapid propagation of alluring but poisonous coral polyps, the accumulation of sedimentary layers of ammonia (a slimy dust impossible to vacuum), hidden mounts of rotten velvety uneaten food, a broken thermostat too warm even for tropical waters, an open window and the unwelcomed visit of the polar wind, a dirty filter and then one too sterile and thus lacking bacterial friends, cloudy glass covered by “undesirable” cyanobacteria, algae-destroyer crabs, and more.

These experiences are why I see my marine aquarium not as a simple miniature simulation of the sea but a permanently in-progress project that stages the failure of the fantasy of biological control when confronted with its own material agency. In this sense, the paradoxes of clumsy tenancy appeared to me as vital forces that swirled inside this vessel full of possibilities for material and more-than-human engagements.

As an alchemist’s pot of entanglements, I imagine that I’m enmeshed within this aquarium and lured by its impossibilities like Anna Thynne (fig.10) —the woman who first had an established marine aquarium in the Victorian era— was when she tried to raise corals drawing solely from her deep material intuition. In her diaries she tells that while exploring waters on the England coast of Torquay, she felt irremediably awed by some fleshy creatures, not sure if they were plant, rock or animal, and which chimeric nature wanted to show to her friends in London. Without any previous knowledge of marine biology, but with a background in geology and domestic skills, she took a needle and attached around thirty madreporal corals (fig.11) —also known as mother of stone, the mother of pores or porous mother— to a big piece of sea sponge with thread and carried them in a jar along with a 6 gallon bucket of sea water. In London she created a system requiring a lot of time and human labour on the part of her and her maid—where she performed daily small water changes and poured water backwards and forwards with an open window as a *DIY* method of aeration. For more than six months she kept the madreporals alive only by the nutrients provided by the rich and thick oceanic water, providing no external food. One day, she observed that their tentacles were thinner and paler, and decided to feed them with tiny pieces of boiled shrimp “which soon restored them to their usual beauty” (Thynne 1859, 450). Being herself a porous mother, she successfully maintained her seawater tanks for over six years, becoming an example for aquarists to come.

May 2nd, 1852— I have now 278 young madre pores, derived from those two mentioned in April 11th, 1850; and they are still subdividing so fast, that every day adds materially to their number. A marble bath is the only “suitable accommodation” (as house agents say) that I can think of such a rapidly increasing family. However, I am unable to see

the result, as I am obligated to leave the coast, and my thoughts and leisure will be so entirely occupied with more serious duties, that I cannot encumber myself with even a part of my flock. I shall therefore commit my much-admired little favourites to the ocean, in the sheltered and rocky cove of Waterwinch, and hope they will form a colony on the shores. In future years, should opportunity occur, I shall make a point of looking after them (Thynne, 1859, 457).

Despite Anna Thynne aquarium project was settled in a context where the engagement with nature was tightly connected with the emergence of Natural History and ideas of nature’s fetishization through collectivism—an activity mainly possible under a status of social privilege—I do feel that her pioneer aquarium can be interpreted as an experimental interspecies entanglements crafted from epistemological precarity. Rather than from scientific statements, she explored materially and performed the ability to think-with madreporals in order of not fully understanding or dissect the creatures, but to care about their needs and improve their captive living conditions, making collaboration possible in the edge of unmanageability and failure.

The objectification, classification, and capitalization of nature specimens through collectible and decorative items is a well-established cultural phenomena, practiced from the “European Age of Exploration” and evolving with industrialization and the modern development of Natural history. The 18th century was characterised by a turn towards possessing “nature”, a reaction to an industrial society that was seemingly drifting apart from it. In place of everyday physical encounters, new advances in preservation created novel entanglements with nature that were technologically mediated. Cultural historians such as Celeste Olalquiaga (1998) have identified how the production of natural “objects” during the Victorian era transformed feelings over the “loss” of nature into a desire to “collect” it in static, preserved forms. Olalquiaga outlines the fervour for natural collections, cabinets of curiosities, replicas of natural specimens for scientific studies, and fossils that characterized this era. This compulsion to possess nature went beyond crystallization of life by the extraction and collection of dead items; it was also pursued through domestication. Greenhouses, zoos, vivariums, and particularly public desire for “aqua vivariums” as live replicas of the uncanniness of the sea operated in the Victorian era as romantic allegories of nature and precious souvenirs (Burmans and Tien, 2019)

Emerging from the foundations of the modern crisis of dematerialization, aquaria became environmental antidotes that brought nature indoors, with all its complexity, which became rapidly translated as luring magical powers. So it was that early aquariums were advertised as objects capable of transforming an ordinary room into a *living room*.

Performing some sort of household mutualism, aquariums promised to make the interior more vivid while the domestic setting offered to serve as host by bringing light and thus expose what before remained obscure on the bottom of the sea. In this sense, both aquaria and domestic spaces cooperated towards a symbiosis performed by objects and decor.

Once in display —as if were antique screens— aquariums function as containers and mediums to see through, translucent assemblages meant to *be observed*. This transparency though, is a *trompe a l'oeil* for our culturally trained eyes, and where we see clarity many microscopic encounters and chemical reactions are happening, and this seemingly calm water is in fact experiencing constant change and processes of Heraclitian transmutation. No matter how clear they are, the glass edges of my tank cannot control the diversity being crafted inside. Commissioned to hold water and avoid the diffuse cause of the sea, the glass, conversely, becomes a magnifier of the oceanic endeavour. The spatial confinement of the aquarium restricts material variety and environmental serendipity, but at the same time amplifies the transcorporeality between what it's inside and intensifies the effect on beneficial and harmful interactions. There's no such thing as biological distancing in there, and even the pH of my submerged hand or tiny bits of skin covered by the dust trapped on my keyboard must have fallen in and have affected the chemistry of this vibrant broth where *everything is* —irremediably—*connected to something else*.¹

Victorian tanks performed a physical and rhetorical metonym of the sea by literally taking small pieces from it that were periodically refilled only by fresh marine water brought from the coast, and by being advertised as possessable portions, living samples that were representative of the ocean as a whole. When I see —through— my tank, the surroundings get reflected in the glass. It dazzles as a mottled figure that absorbs the context and cements new layers over the material history and stories of the object. It is a container that is not only representative of the sea, but a metonym of our daily interaction as multispecies beings embedded within an environment that gurgles of naturalcultural encounters, and whose ongoingness is knotted by the industrial scars of progress.

¹ In the chapter *Circling Vultures* of the book *Flight Ways*, Thom Van Dooren calls for modes of responsibility by creating awareness of the entangled cycles of living and dying by focusing on the vulture communities in India whose lives are threatened by the use of diclofenac on cattle industry. In the context of vulture's ongoing extinction he writes: it does not seem to be enough to say "we are all bound up in relationships of dependence in a multispecies world" The brand of holistic ecological philosophy that emphasizes "everything is connected to everything" will not help us here. Rather, everything is connected to something, which is connected to something else. While we may all *ultimately* be connected to one another, the specificity and proximity of connections matter —*who we are bound up with and in what ways*. (Van Dooren 2014, 60)

The tropical aquarium of my studio was inhabited by four decorator crabs, that for the course of four months were studio allies, subjects to take care of and companions of material stories truly tied with the context. This environmental set was not isolated from climatic nor social disruption, either from the killing/nurturing² tension that permeates the atmosphere of human and more-than-human collaboration. While the first pair of crabs suffered from a broken heating system and unexpected outdoor weather conditions, the second companions had to find refuge and return to the store where I purchased them as the global pandemic prevented me from having access to my studio and unable to keep them anymore.

Decorator Crabs, *Camposcia retusa*, are a type of spider crab that, in the same fate of other nonhuman, non-dominant, uncommon critters, have been an object for anthropomorphizing human lenses, which stamp and label these creature's protective behaviour as "decoration". In an attempt to look "less-crab" or "more-than-crab", they select materials, debris, and other living beings from their environment to adorn their shells, placing them over a velcro-like surface that covers their carapace and facilitates these attachments.

This method of camouflage is called "self-decoration", and it designates not just the natural strategy that decorator crabs, carrier shells, caddisfly larva, sea urchins and others creatures perform for mimicry, it also refers to the strategy used in military camouflage of picking things from the environment such as netting, local plants and organic debris to cover objects and human bodies in order to conceal them by blending with their surroundings. The designation of the crab as "decorator" traps the crab in a human exceptionalist lens, but in doing so it paradoxically de-entangles and re-emphasises the contradiction of the term "decorator" itself, blurring the limits and cultural origins of decoration by considering it a more-than-human behaviour. (Burmam and Tien, 2019)

In Donna Haraway's terms, these crustacean companions are *critters of the mud. Chthonic ones*.

They follow the cycles of decay and create new ways of living from them. With their ten-legged bodies, these decapods scavenge, wander, hunt and create material assemblages ready-to-wear using their pincers as scissors and pliers. Their bodies don't end at their skin,

² In the chapter *Sharing Suffering: instrumental relations between Laboratory Animals and Their People* Donna Haraway writes about the power structures but also affective implications involved in the study of or with animals in labs. By acknowledging the killing and nurturing tension that always exists in this type of unequal collaborations Haraway aims to create more ethical ways of handle these projects, by for example making an essential part of the research the calculation of risk and benefits and the discovery of methods that leads to positive reactions and improve lives quality on animals in labs (Haraway 2009, 70-93)

and their fuzzy shells extend into tactile sensors that at the same time are hooks for materials to stick and shelter for other creatures to hold and survive. Exhibiting overlapping preferences for the items that they choose to decorate with and what they like to eat, it is common to see them encrusted by fresh and rotten pieces of food. Living, making and “decorating” among biological ruins and detritus, they *Stay With the Trouble*, even in artificial settings.

The selective nature of decorator crabs has been a puzzling subject for behavioral biologists and it has been observed that their decoration performance is tightly related by their sense of vulnerability. Mimicry and masquerade techniques are not only displayed by the crabs to confuse and hide from their predators, they are also a response to their sense of precariousness, and studies have demonstrated that crabs with no shelter decorate significantly more than crabs that count with some kind of support (Rohan M Brooker, et al 2018). This takes me back to my analysis of social assemblies and the strategies for resistance and survival that are collectively applied for gaining protection in a society of risk. I wonder if the actions of these human bodies can be also considered self-protective behaviours or even camouflage? While crabs seek to acquire a certain invisibility by blurring their individuality with their surroundings, human bodies in collective action demand to be visible from attaching themselves to other bodies. Both are receptive to different corporealities and pieces of the environment as safety allies.

Carrying the marine and terrestrial ground with them, the corporeality of decorator crabs is a statement of non-singularity and an act of trust towards the environment. Their radical permeability depends upon the alliances between species and the reinvention of available resources. They take materiality seriously and entangle themselves with what they encounter, shifting material hierarchies, stitching from the underground and knitting their *umwelt*³ from what sinks to the benthic bottoms.

Permeating their shells and soaking their environments, decorator crabs in open water are threatened by conditions that exceed their artfulness and ability to adapt. The high concentrations of CO₂ thrown into the atmosphere and absorbed by the sea is progressively changing the ocean chemistry into an acidic pH that erodes calcium carbonate, present in shells, bones, coral reefs and exoskeletons of animals at an evolutionary

³ The biologist Jakob von Uexküll developed the notion of *umwelt* in which the agency of each organism is recognized by the idea that every being (focusing his research on nonhuman species, such as ticks, sea worms, jellyfish, amoeba) has its own perspective, and through this unique point of view the organism performs as the center of its own world, from where it interacts with other organisms and their *umwelts*. “Every subject spins out, like the spider’s web threads, its relations to certain qualities of things and weaves them into a solid web, which carries its existence” (von Uexküll 2010 [1940], 53)

scale that ranges from whales to planktons. The acidification of the Anthropocene’s oceans leads crustaceans like the decorator crab to be exposed to the disintegration of their carapaces: their shielding and most reliable materiality within a world that oscillates in waves of uncertainty and vulnerability.

In “Your Shell On Acid”, Stacy Alaimo calls for an empathic shift of scales as an embodiment of ethical and political action in the mode of material feminism: what if instead of contemplating the erosion of marine creature’s shells, we humans imagine ourselves inhabiting shells whose edges slowly disappear until acid touches our skin? To hallucinate the dissolution of the human as an extension of our trans-corporeality is to connect the vulnerability of non-human bodies with our own lives undulating under environmental risk. “To ignore the invisible threats of acidity or toxins or radioactivity is to imagine we are less permeable than we are and to take refuge in an epistemological and ontological zone that is somehow outside the time and space of the anthropocene.” (Alaimo, 2016)

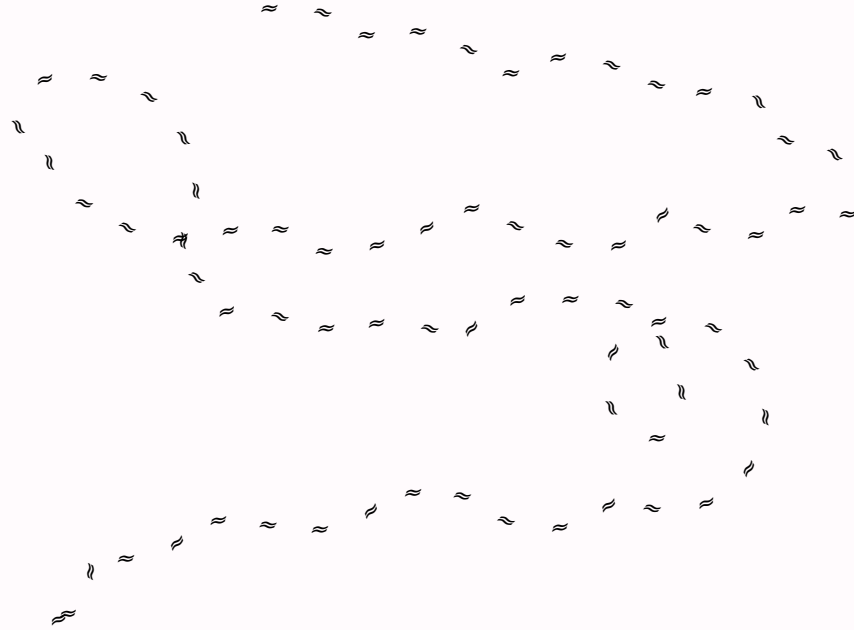
The ocean’s acid woke us to the recognition that human actions do not operate in a separate dimension, and we are all inescapably enmeshed with the environment which, rather than a cosmological conception of equilibrium and interconnectedness, urgently requires a collective effort, crafty ways, and response-ability. The lethal dissolution of protective layers of marine animals and the potential extinction of decorator crabs disintegrates the conceptual separation with the environment in a dramatically embodied way.

The ocean of the present is 30% more acidic than it was at the beginning of the industrialized era. Aquariums, therefore, froze their chemistry long ago, and their ideal watery alchemy is a crystallized souvenir dated from the Victorian epoch. The acidification of the ocean and the endangerment of its inhabitants, drags us again to the question of the unseen, and while the materiality of this event is not perceptible to our sight, it becomes palpable in calcifying creatures as they turn to dust. The doctrine of terrestrial visibility tries to drill into the ocean, but in doing so a *sea change* is suffered by its methods: there is not much evidence of how organisms other than ones with calcite or aragonite shells and skeletons will respond to ocean acidification, and the reaction of marine microbes remains uncertain. What we do know is that water below 350m has a low pH — less than 7.8, the level projected to be the pH on the ocean surface by 2100— and in those acidic depths microbial assemblages continue their trans-corporeal interactions.

Moreover, some species of cyanobacteria benefit from high concentrations of CO₂, and their photosynthetic activity is empowered by low pH, while bacteria in freshwater colonies are already acclimated



to extreme daily changes in water chemistry (Doney and Karl 2011; O'Brien et al 2016). Again, scientific studies and projections remain on the surface and don't dive acknowledging the multilayered depth, diverse ecosystems, and chemical flows that are contained and coexist in the ocean's *continuum*.



Imagine now, that in 200 years, microbial communities will either adapt or symbiotically evolve through trans-corporeal exchanges after this great acidification event. Would this life be dusty, and dry, or soft and slimy in its becoming?

Can we think-with the materiality of a world that no theories of history has told us how it will look?.

To evoke, to speculate, to hallucinate or try to craft within an environment where human entities have possibly dissolved, is a way of performing posthuman abstraction, laying the groundwork for alternatives multispecies acts of care. Being aware of what is at risk of disappearing in visible and more-than-visible realms, can guide us towards response-ability. We're not passive spectators, and nature is not a background. We can deliberately decide what we need to disintegrate as we dismantle the utilitarian facade installed over the environment.

Our ontological motherly porosity is both liquid and absorbent It dissolves and condenses. If we conceive our substantial materiality and release just the right amount of liquid, perhaps it creates a potion, a soup to evolve, a solution for mutation, or fluid alliances for an outbreak—a liquefaction that replaces the hierarchies of a human-centered world

REFERENCES

- ≈ Alaimo, Stacy, "Your Shell on Acid", Exposed, 2016.
- ≈ Brunner, Bernd, *The Ocean at Home: an illustrated History Of the Aquarium*, Reaktion, 2011.
- ≈ Burmann, Elizabeth, Gianni, Tien, "Thinking-with Decorator Crabs on the Aqueous Anthropocene", Unpublished, 2019.
- ≈ Brooker, Rohan, Muñoz Ruiz, Enid, Sih, Tiffany, Dixson, Danielle, "Shelter availability mediates decorating in the Majoid crab, *Camposcia retusa*", *Journal Behavioral Ecology*, Volume 29, Issue 1, 2018, Pages 179–185.
- ≈ Haraway, Donna, *When Species Meet*, University Of Minnesota Press, 2009.
- ≈ Van Dooren, Thom, *Flight Ways: Life and Loss at the Edge of Extinction*, New York: Columbia University Press, 2014
- ≈ Von Uexküll, Jacob, *A Foray into the worlds of Animals and Humans with a Theory Of Meaning*, Introduction Dorion Sagan-Geoffrey, University Of Minnesota Press - 2010 [1940]
- ≈ Joint, I., Doney, S., Karl, D, "Will ocean acidification affect marine microbes?", *Journal ISME*, Issue 5, 2011, pages 1-7 - <https://doi.org/10.1038/ismej.2010.79>
- ≈ O'Brien, Paul, Morrow, Kathleen, Willis, Bette, Bourne, David, "Implications of Ocean Acidification for Marine Microorganisms from the Free-Living to the Host-Associated", *Journal Frontiers in Marine Science*, Volume 3, 2016.
- ≈ Olalquiaga, Celeste, *The Artificial Kingdom: a Treasury Of the Kitsch Experience*, Pantheon Books, 1998.
- ≈ Thynne, Anne, "On the increase of Madreporae", *Annals and Magazine of Natural History*, London: Taylor and Francis, 449–461. 1859.
- ≈ Tsing, Anna, Swanson, Heather, Gan, Elaine, Bubandt, Nils, *Arts Of Living on a Damaged Planet*, University Of Minnesota Press - 2017



fig. 1

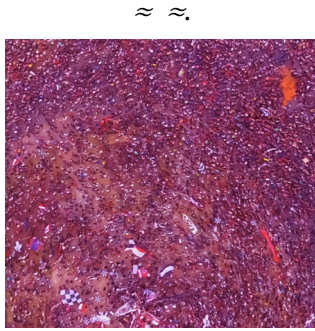


fig. 5



fig. 9

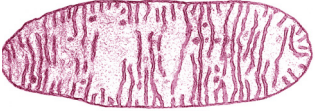


fig. 2



fig. 6



fig. 10



fig. 3



fig. 7

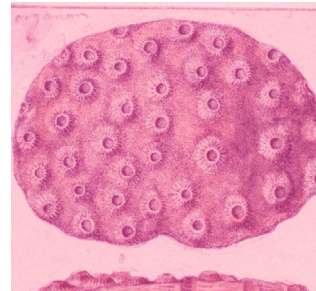


fig. 11

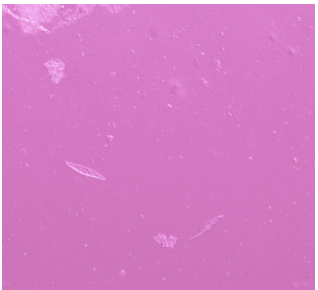


fig. 4



fig. 8

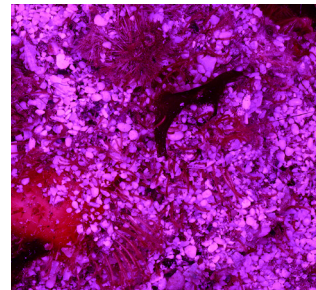


fig. 12

≈ ≈

fig. 5 ~ Aerial image from *La Marcha Mas Grande de Chile*, screenshot from the original image by © Skyfocus, 2019.

*Even the panoramic view, portraying the protest as a “whole” fails, the image only can show us a portion, a frame of it. The sum of the parts and the bodily experiences of the protesters exceed the idea of wholeness.

≈ ≈ ≈

fig. 6 & 7 ~ Images selected from the hashtag #noessequiaessaqueo showing a desertic field on *Villa Alemana* (fig.6) and the dry *Aconcagua* river in Chile (fig.7).

*The intervention on the landscape reminds the site specific works of the poet *Raul Zurita* (fig.8).

fig. 8 ~ *La vida nueva*, intervention on the sky of New York, *Raul Zurita*, 1982.

*Zurita uses lands, rocks and also the sky as medium for poetry and political denunciation. The first interventions of Zurita were done in response during the times of Chilean dictatorship, when he was part of the collective *C.A.D.A.*

fig. 9 ~ (on the next page) Nitrogen Cycle chart adapted from the book *Aquarium Techniques*, A.O. Janze, 1964.

fig. 10 ~ Portrait of *Anna Thynne* and her daughters *Emily* and *Selina*, posing as the three graces, *Unknown* author.

fig. 11 ~ Drawing of *Madrepora* coral, *Madrepora organon*, *Print*, *Iconographia Zoologica*, *Special Collections University of Amsterdam*, UBAINV0274 109 09 0005.tif, Uploaded: 3 February 2017

3. Decorator crab's dried shell, captured with macropod at *RISD Nature Lab*, in collaboration with *Ben Gagliardi*, 2019.

≈

fig. 1 ~ cyanobacteria colony, © open science source.

fig. 2 ~ mitochondria, © open science source.

fig. 3 ~ *Dr. Lynn Margulis*, from the archive of *Hummingbird films* <https://bummingbirdfilms.com/wp-content/uploads/2018/02/Lynn-Margulis-slide-batch-4-100x80.jpg>

fig. 4 ~ *Phytoplankton and cyanobacteria* from domestic saltwater tank, image captured from compound microscope at *RISD Nature Lab*, *ELIZABETH BURMANN*, 2019.

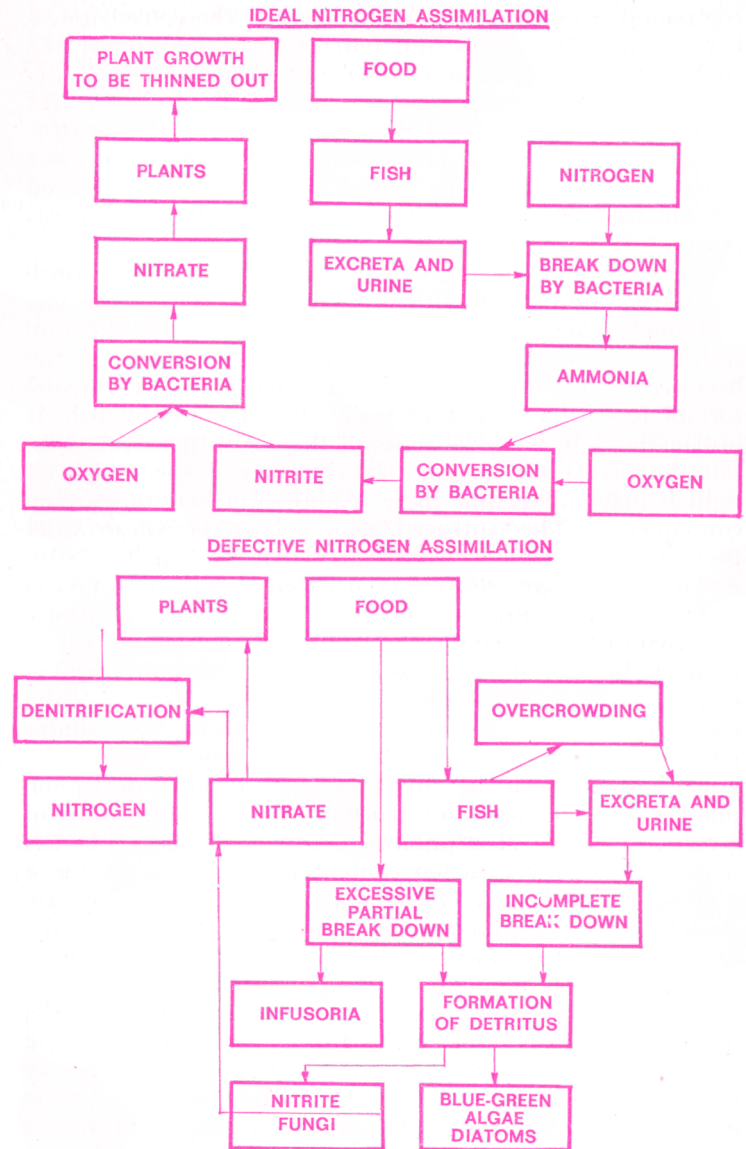


fig.9

