



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Notating not knowing

Citation for published version:

Armstrong, R, Ferracina, S, Hughes, R & Kakalis, C 2020, 'Notating not knowing: The oceanic challenge to format and medium', *Edinburgh Architecture Research*, vol. 36, pp. 13-34.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Edinburgh Architecture Research

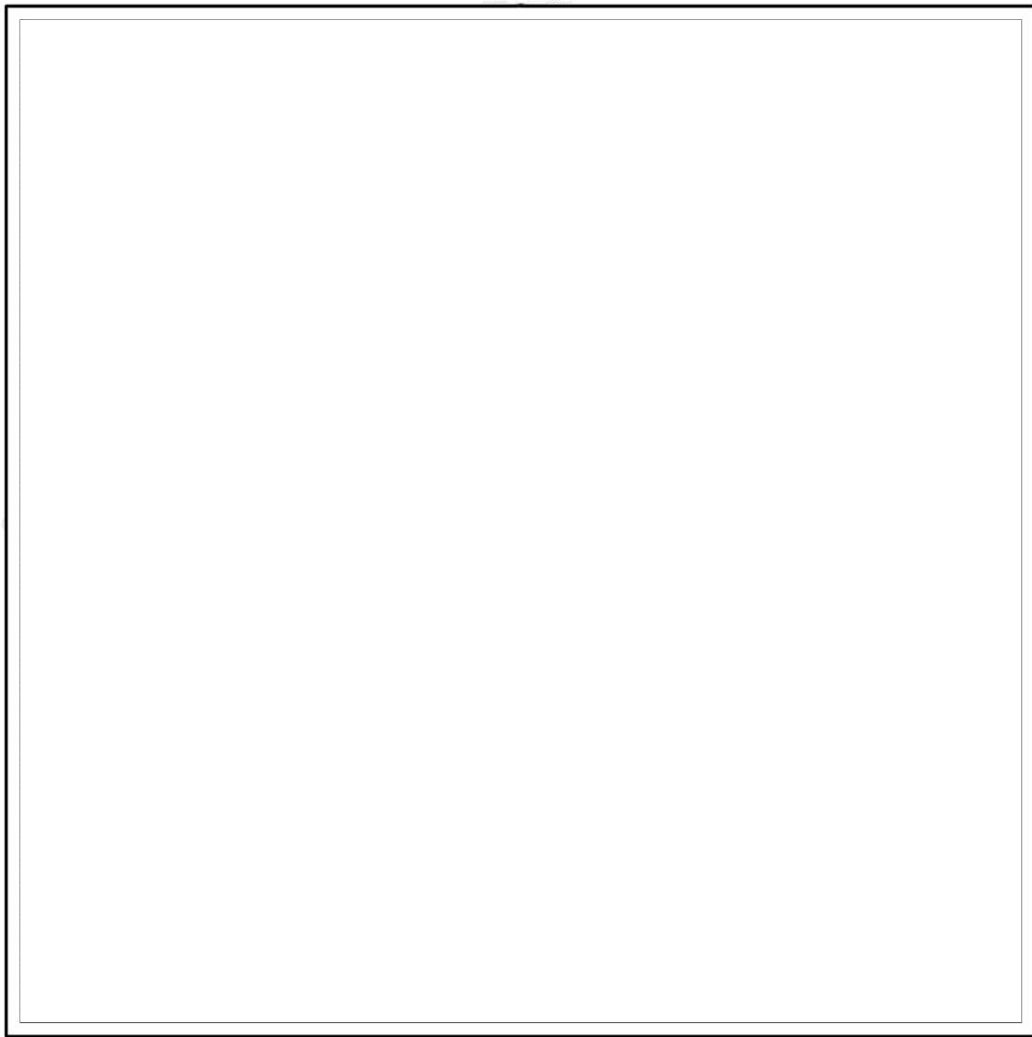
General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

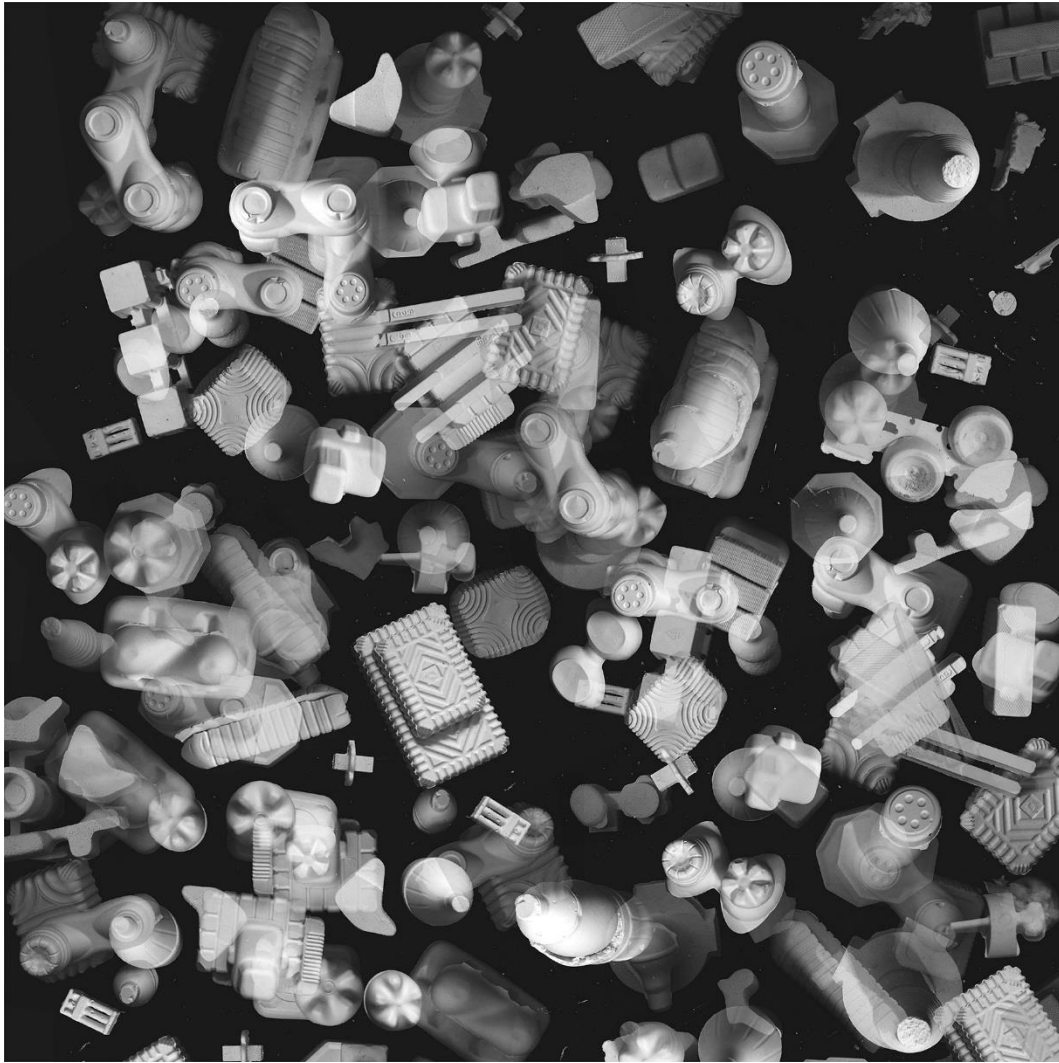
The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.





Notating Not Knowing: The Oceanic Challenge to Format and Medium

Rachel Armstrong, Simone Ferracina, Rolf Hughes, Christos Kakalis



Strange Notations: from tabula rasa to rasura tabulae, Simone Ferracina¹

¹ *All media are active metaphors in their power to translate experience into new forms.*

(McLuhan, 1994: 57)

Formats enforce—and operate within—normative relational ecologies and precise equipmental orientations. The A4 sheet of paper is defined by the standard ISO/DIN proportions (aspect ratio of the square root of two) and by productive machinic interactions (the physical correspondence of printer tray and sheet of paper as the basic requisite for printing). Similarly, the shape and size of a styrofoam packing box follows that of the item it contains and insulates; a queen-sized bed affords the lying of two human bodies next to one another; the external thread of a metal bolt matches the internal thread of a nut, etc. Formats across scales unlock relational affordances while simultaneously forcing objects into obligatory, often instrumental, interactions. Form(at) follows function, and the resulting monocultures reject, conceal and foreclose all manner of *other*—non-teleological, bottom-up, spontaneous, queer—encounter. Effectively, most violations to functional scripts (in the sense of the broken hammer famously described by Martin Heidegger, but also in a wider spectrum of valuing and de-valuing industrial and cultural practices/orthodoxies) and non-conformance to the interior laws of prescribed standards (Le Corbusier's Modulor versus André the Giant) result in rejection and eviction—in the production of waste. In this sense, the functional value of an object is determined not by its intrinsic qualities (rigidity, porosity, weight, texture, etc.) but by external factors; by its equipmental fitness (in the Heideggerian sense) and degree of co-adherence. While formatting/design enables objects to productively talk to one another (to form alliances), it also installs the principles whereby they will be muted, and become obsolete. The single-use polyethylene bottle is a case in point: once it

exhausts the capacity to transport mineral water from the factory to the consumer, and can no longer retrieve a ‘proper’ (formatted, designed) working sequence, it loses all value—regardless of whether it has undergone any actual physical change.

Media, in the McLuhanian sense of the term, promote a looser and more plastic set of possibilities, beyond the design and naming of perfectly fitting and predictable machine cogs. Rather than referring to a mere communication channel or technological extension of human faculties, the term ‘medium’ denotes a space for non-scripted action, an unleashing of potentialities that is as spatially situated/constrained as it is open-ended. The light bulb, for instance, creates the environment in which a wide range of actions and interactions become possible, conquering the darkness of night. (McLuhan, 1994) And while a medium always depends on localized—implicit or explicit, simple or complex, designed or emergent—infrastructures, it also invites liquid encounters: the development and unfolding of unexpected and transitory *teloi*. Using McLuhan’s celebrated formula, we might ascribe the difference between formats and media to the presence or lack of associated messages, or to their degree of readability.

And while the two terms can be imbricating and even coextensive (is a light bulb not both?), the former potentializes by exclusion and the latter by inclusion/annexation. This different approach reflects two possible interpretations of *tabula rasa* as a figure of potentiality.

Giorgio Agamben traces the philosophical origin of *tabula rasa* back to Aristotle’s *De Anima*, in which the intellect (*nous*) is likened to a writing tablet (*grammateion*) “on which nothing is actually written” (Agamben, 1999:244). The passage into actuality (*energeia*) of potentiality (*dynamis*) is represented by the act of writing, by engraving text (content, form) on the blank (contentless, formless) surface of the *grammateion*. Yet how can a rigid implement such as a tablet represent, even metaphorically, the indeterminacy of potential thought? Agamben seemingly condones this apparent contradiction:

The difficulty that Aristotle seeks to avoid through the image of the writing tablet is that of the pure potentiality of thought and how it is possible to conceive of its passage to actuality. For, if thought in itself had a determinate form, if it were always already something (as a writing tablet is a thing), it would necessarily appear in the intelligible object and thus hinder intellection (Agamben, 1999:245).

In other words, Aristotle employs the image of a “determinate form” (a format: the tablet) to illustrate an undetermined being (a medium: the intellect) that is, by definition, formless. Both the *tabula rasa* and the *tabula scripta* are however already actual, and exist as things. Agamben excuses this disjunction because the philosopher “takes care” to clarify that mind “has no other nature than that of being potential, and before thinking it is absolutely nothing” (Aristotle, 1986. Quoted in Agamben, 1999:245). After all, the tablet-thing is for Aristotle merely a vehicle for blankness. It is the nakedness of the tablet, the fact that nothing is written on it, that allows it to mirror the nothingness of mind. However, precisely in the fracture that seems to expose the incompatibility of potentiality (nothing) with actualized form (something), we might find a key to undermine the trope of “creation from scratch” and to redefine and repurpose *tabula rasa*. Our starting point is an observation by Alexander of Aphrodisius, who suggested that Aristotle should have spoken of *epitedeiotes*, the thin layer of wax covering a writing tablet, rather than of *grammateion*, the tablet itself (Agamben, 1999:245). This apparently modest shift in focus, from *tabula rasa* to *rasura tabulae*, resolves the contradiction by replacing the rigidity of the wood with the suppleness of the wax, which, like mind, is malleable and can’t therefore be fixed into definitive, stable forms. But more importantly, it substitutes the blankness of the tablet with the plasticity of the writing surface, a formatted lack of content with a medium. It no longer matters whether the tablet is unscribed, whether the wax has been recently melted and smoothed clean or engraved with words. The wax is shapeless insofar as its shape can change: radical contingency, not blankness, is the medium of pure potentiality.

This shift from *tabula rasa* to *rasura tabulae* suggests that formats can be re-oriented towards

previously unforeseen functions, *de facto* becoming media. The *Formwork* project performs such transformations by using formatted discards like food packaging and e-waste as moulds for plaster and concrete casts. An ever-increasing architectural *abécédaire* emerges from this on-going practice, whereby plastic containers and disposable objects become manufacturing tools associated with a novel construction alphabet—a bottom-up notational system for spatial choreography and recombination. Yet this is not just upcycling in the narrow sense of a value increase or of a dodged de-valuation that reboots (reformats) materials into new, albeit equally strict, functional roles. Rather, the resulting bricks, while carrying the indexical memory of previous equipmental ecologies, remain radically open to interpretation and subject to impromptu association, appropriation and manipulation.



Liquid Life, Rachel Armstrong²

² Western design conventions view reality as a machine. The transition from raw matter to formatted materials – specifically in the embodiment of ideas – almost inevitably requires translation through the *bête machine*. Based on the ancient principles of atomism, this worldview proposes that fundamental objects comprise the whole of reality, and dissociates strange and super-natural events from the material real. The machine converts all ‘real’ encounters into the logic of mathematics enacted through ‘brute’, de-animated bodies, which require external agencies to empower them. The machine metaphor applies across all scales and materials from cells to bodies, apparatuses, ecosystems and the cosmos. This worldview has been modernized and refined through industrial systems and their associated methods of making. Everything we make and describe in contemporary design practice is filtered – in one way or another – through the constructive logic of machines.

The success of the machine metaphor is that it embodies its own philosophy and therefore its structures refine and reinforce the concept of machine through its myriad expressions, enabling mechanical systems to address all kinds of contexts. The ease of demonstrating a mechanical worldview through experimental methods should not be underestimated, as it can be designed to perform useful work. While it has brought many advances in the modern understanding of the natural world – it does not perfectly speak for the extraordinary phenomenon of life, which is by nature in a state of constant transition that is sensitive to its contexts.

If the capacity of formats to become media is to be unleashed, the machine metaphor must be de-centred from its stranglehold on reality.

Of course, since ancient times there have been other models for understanding the world ranging from the divine and mythological, to the flowing realms proposed by Heraclitus. Diderot argued against the mathematical mechanist conception of matter (Stengers, 2000) and Ludwig von Bertalanffy championed the application of ‘systems’ science and cybernetics (von Bertalanffy, 1933). However, the weakness of these frameworks is that their arguments are not embodied but symbolized through their associated apparatuses. The more concrete proposals, such as Bertalanffy’s extended vocabulary for encounters and their operations through notions of information, control, feedback and communication, offer more complexity than classical machines. In practice, the founding ideas are constructed through modifications of inert-bodied machines, where action within the system is transduced back into its operations to maintain a steady state such as in Ross Ashby’s ‘homeostat’, which was imagined as an ‘artificial brain’ (British Library, 2016). The emphasis on relationships between objects as the driver of change actually reinforces, rather than decenters, the fundamental atomism within mechanical systems. Without an ontological shift, cybernetics strengthens the idea that the difference between nonlife and life is merely a matter of structural and organizational complexity.

It is not. Machines and cells are very separate ontological agents. Life is probabilistic, while machines are deterministic systems. Life is observed within far from equilibrium systems while machines operate within a world at relative equilibrium. Life is deeply correlated with its surroundings while machines are not sensitive to their environmental contexts. Drawing on these differences, a counterpoint metaphor and model to the machine metaphor is used to develop an alternative discourse for life that is more than a theoretical proposal but operates through actual structures that were first described by Ilya Prigogine as ‘dissipative systems’ (Prigogine, 1977), which possess their own energy and agency. The unique ability of dissipative systems to interact with their environment is not conferred by an external agency, but arises from their ontology being produced by ‘charged’ fields of matter/energy. These dynamic structures can be demonstrated using the chemical Bütschli system as a visualization tool. This apparatus generates strikingly lifelike droplets that are capable of movement, sensitivity and population-scale behaviours (Armstrong, 2015), which arise out of the intersection of olive oil and concentrated alkali. They leave soapy trails and structures behind them, which can be read as a polysemic liquid language and interpreted, or ‘screed’ by observers, as a range of recognisable events. Moreover, changing the external environment of the field, for example by adding alcohol to the olive oil, can influence events. Altering the chemical composition of the liquid body can also produce various precipitations – adding soluble salts like a blue copper II sulphate solution, for example, transforms it into deposits of greenish copper carbonate. The strange yet somewhat familiar images, symbols and behaviours that arise from the Bütschli system and its ‘loose’ modes of technical control, draw upon the combinatorial and contingent properties of matter at far from equilibrium states, which cannot be embodied by mechanical systems as they are not finite. The variations within the system may be understood as chemical computations (Armstrong, In press). The Bütschli apparatus therefore offers a means of testing and producing materials and effects, which open up a space for new kinds of notation, and ultimately design processes, using liquid media that evade filtering through the *bête machine’s* logic – and provide access to the oceanic, a term that draws on the irreducibility, relative invisibility and hypercomplexity of the terrestrial seas comprising “an ideal spatial foundation... [that] is indisputably voluminous, stubbornly material, and unmistakably undergoing continual reformation” (Steinberg and Peters, 2015). Its ontology arises from the inherent creativity of agentised matter, and invites poetic readings to produce maps of events, rather than theories of concepts (Lee, 2011). In other words, the oceanic resists formatting knowledges and enclosures to continually invent, foster and become new media.

ⁱ Notation by Simone Ferracina, movie footage from Bütschli experiments by Rachel Armstrong, 2017. These Bütschli notations by Simone Ferracina are produced by layering the events within an emerging system and begin to discuss the incalculable creativity of liquid life.



Scoring-as-such, Christos Kakalis³

³ Mapping liquid realities suggests an embodied topography in which humans, natural and built environment are interrelated in an organic whole that keeps changing. Etymologically “topography” combines the Greek word for place (*topos*) with the one for writing (*grafein*), relating experience to the notion of inscription, and is traditionally connected to “the accurate and detailed description or delineation of locality” (Casey, 2002: 153). A phenomenological understanding of place challenges this static understanding of space, bringing to our attention its eventual qualities; place becomes the event of its interacting components. In such a non-representational understanding of topography the psychic and physiological, the natural and the artificial, the hidden and the unhidden are unified in the corporeal agency of the subject. In this context, exploring the liminality of aurality, Gernot Böhme argues that “atmosphere (...) is the reality of the perceived as the sphere of its presence and the reality of the perceiver, insofar as in sensing the atmosphere s/he is bodily present in a certain way” (Böhme, 1993:113–126). Ambience is fluid and vague and its attuning dynamics emerge in the tension between the perceiver and the perceived. This is manifested in the silence that, according to Juhani Pallasmaa, is “a multi-sensory and existential experience of being, rather than of listening. It is the existential ‘thickness’ and richness of silence that gives it its poetic authority. (...) Silence is an atmospheric and qualitative perception that fuses the percept and the perceiver” (Pallasmaa, 2015: 197).

Distinct from the absence of sound, silence is a material condition incorporated in the experience of both architecture and natural landscapes. It might be understood as either human or atmospheric. Human silence is concerned with the silencing of the voice and atmospheric silence relates to a multi-sensory phenomenon that creates a sense of solitude and a sensual

opening/receptivity to the surrounding environment. Silence is interconnected to ambient sound and human vocalisation. Human silence always carries within it a sound *in potentiality*, the suspension or withholding of vocal emissions – atmospheric silence cannot be a completely *soundless* event: “...one must acknowledge a surrounding environment of sound or language in order to recognize silence. Not only does silence exist in a world full of speech and other sounds, but any given silence takes its identity as a stretch of time being perforated by sound” (Sontag, 2002).

Analysing human attunement to sonic atmospheres, Gernot Böhme suggests two different ways of listening (Böhme, 2000: 18). One refers to the idea of “listening as such”, the other is about our “listening to” an acoustic event coming from a specific source. In “listening as such,” the individual is invited to keep silent, opening up to the surroundings. The individual falls into

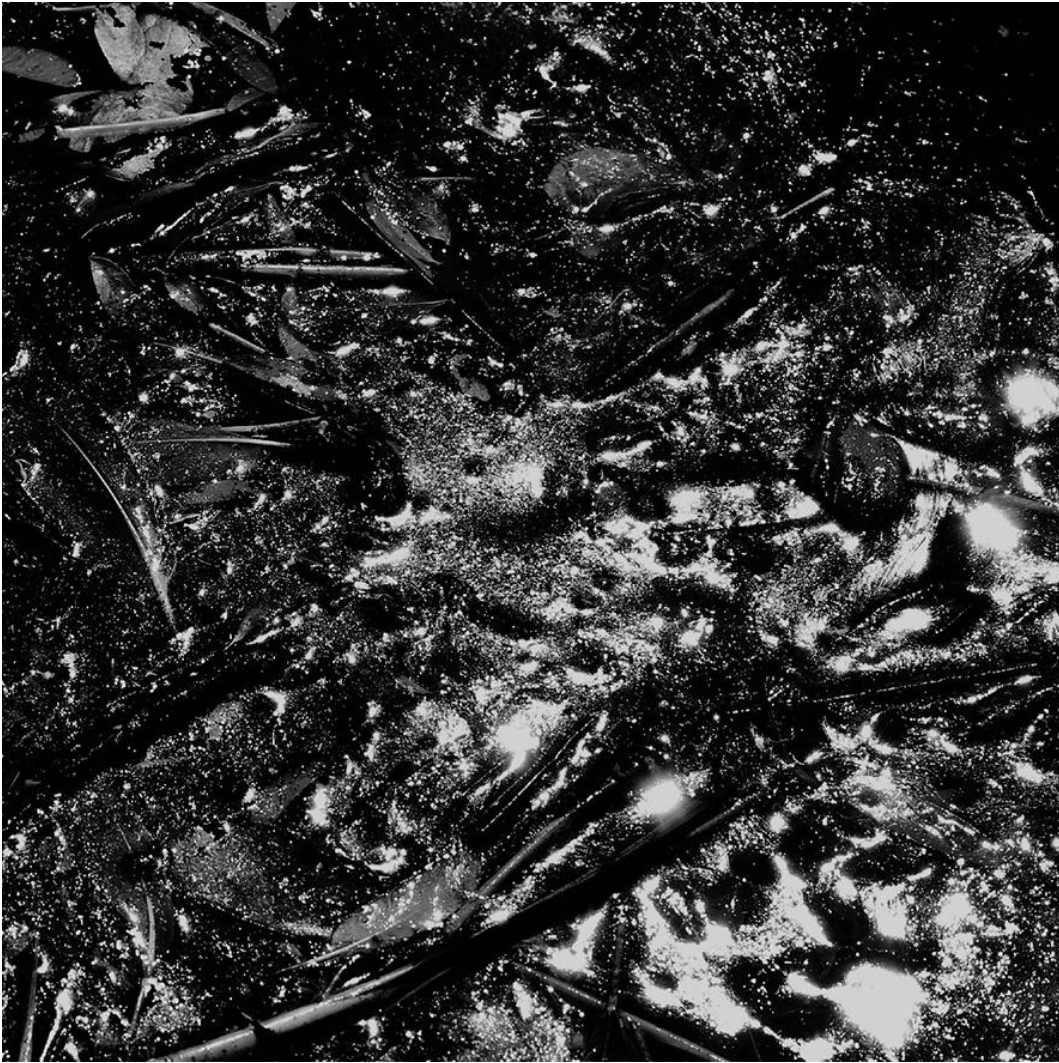
a listening which does not leap over (...) sounds to the sources where they might stem from, listeners will sense (...) sounds as modification of their own space of being. Human beings who listen in this way are dangerously open: they release themselves into the world and can therefore be struck by acoustic events (Böhme, 2000: 18).

Silence is a kind of *waiting* for sounds, inviting the individual to *listen to* them. It is an attentive multisensory listening and a way of human attunement to the surrounding environment with an intense future projection.

Difficult to transpose, silence calls for a non-linear understanding of atmospheric translations that reminds us of the musical scores of minimalist composers, such as Arvo Pärt and John Cage, that either through specific compositional methods (*tintinnabuli* and *charter* techniques respectively) or experimental notation have sought to express ideas such as silence and stillness in a performative way that is fully unfolded in the sonorous ambience of the piece. The analogy between musical notation and mapping is very useful in questioning the transposition of silence that falls into the liminal zone between format and medium. Following Böhme’s argument, a *scoring as such* challenges the rules of cartographic formatting and traditional methods of site analysis, allowing for liquid qualities such as silence to be expressed through open representational schemes/models.

This diagram depicts moments of the silence-scape of Mount Athos, a pilgrimage site in north eastern Greece where a male monastic community practices hesychasm, an ascetic way of life with intense meditational qualities. Human and atmospheric silence are merged here to suggest a sense of stillness as the most important component. Hesychasm derives from the Greek word for calmness or tranquility (*hesychia*). Its aim is the achievement of a state of stillness that involves the inner (silent) ceaseless invocation of the Jesus prayer (‘Lord Jesus Christ, Son of God, have mercy upon me the sinner’) that aims to enable direct communication with God (*theosis*). Athonites remain silent in the open and shared spaces of the monastery as well as out-of-doors, contributing to a sense of emptiness and void. The constant recitation of the prayer produces a drone that embodies and spatialises the wait for divine communication. Concurrently, the repetition of communal rituals as well as specific (practical) tasks during the day and the year enhance the practice of stillness.

Black and white dots, with black depicting the most silent and white the least silent, express moments of the Athonite landscape as experienced during fieldwork and described by ascetics and pilgrims. The polarity of black and white and the opacity of the repeated dots aim to suggest a score that is suspended and “ready to start moving,” or that “has just stopped moving,” as the dots cannot be clearly read being, as they are, frozen in time. The dot is repeated and changes in a controlled way, through three different sizes indicating differing degrees of condensation. Overlaying different episodes of the silence-scape occurred at the same location adds to the dynamic qualities of the result. Combining geometrical with experiential qualities, the diagrams do not claim the authority of a map; they are unfinished, aiming to remain unfinished and open as scoring-as-such moments of a topography that keeps changing.



Oceanic Practices, Rolf Hughes⁴

⁴ We should not connive in the construction of our own abject formats, the surface currents we generate, running a ruler over depth and flow while thoughts flit haphazardly from rock to sky then plunge abruptly towards uncharted oceanic depths. Our lungs, once entwined, are vulnerable to incursions of seawater, which is the source of our peerless intuition, as well as our bottomless rage.

The ocean harbours ingrown volcanoes once known as the island's multiple eyes, but today hollowed and lacklustre. Occasionally, in their manifold furrows, the explorer may glimpse flashes of defiance.

I bought a strong cage and poured in the typing pool, howling like banshees. Today I lower this into the saltwater lagoon. Mounds of swollen flesh slowly ripple, then part as sunken eyes survey their new home. I toss live rabbits and hens which they shred in seconds, gobbling guts and bones alike.

You lunge at me whenever I approach, sending showers of sparks from the iron bars. To have unloosed your soft skin, pressed my lips to your heat until rising subsides in delight, served choice meats from calfskin platters, hands

encased in the finest, blood-mottled gloves – all this counts for nothing in the inferno of fury you have currently brought yourself to.

And so I wait, clinging to a rock gnawed by the ocean, drawing light and energy landscapes – my face in your wild Medusa hair, inhaling its sulphurous musk, ruptured stars – folding a trick back into itself, a perfectly purposeful accident, a ring dropped into a lagoon to summon crustaceans.

Here they come, the billion white-lipped barnacles, sucking mutely on effervescent salt blooms.

What is its medium, this glorious siphonophore – its manifold diversity, microbial alchemy, squirming through plasma landscapes, water islands where one can live by choosing flexibility over strength; by writing liquid naming rituals in water, subjecting the metaphors of the machine to saline jaws until they rust-crumble, diffusing orange cloud-showers of iron nutrients?

Is it the back end of something becoming the front end of something else? Cambrian explosion? Origin of life as stinking pantomime horse?

Or should we prefer a middle to fronts and ends –
Liquid city: sluicing
Back and forth, slice and dice
Material silence, science
Tabula rasa, *thrumming*...

*

Against coherence and causality, the bounded and the rational, *oceanic practices* invite us to yoke together seemingly disparate components to bring forth hitherto latent potentialities. Discourses of identity, gender, genre, disciplinarity, arising from narratives of evolution, science and progress, have framed what passes for criticality in the modern period; *oceanic practices* instead propose vibrant sites of experimentation where categories and certainties are separated and whirled together in new, provisional assemblages. Experimental ecologies within a nascent *ecocene* suggest that the nature of life itself may be choreographed into existence through rethinking interactions between bodies, spaces, soils and the many potential relations between them. Revisiting pre-modern forms of acquiring knowledge, unafraid of scrying, augury, magic and witchcraft, developing concepts and prototypes, *oceanic practices* explore what a third millennial experimental research laboratory – wet, messy, magical and dripping – might involve.

How does one *evaluate* such oceanic (or emergent) practices? By developing assessment apparatuses (languages, materials, methods and instruments) i.e. working prototypes shaped by living processes – choreographies of bodies and spaces in which “epistemic things” appear but are never fully demystified or “solved”. The goal is neither explanation nor paraphrase (i.e. the *context of justification*), but rather inducing experiences from which moments of enchantment and insight appear (i.e. the *context of discovery*).¹ This is an ongoing conversation where the modes of living, tools of assessment, bodies, communities and the materials themselves relate through constant flux. The term *oceanic practices* is used to denote an exploration of our relationship to our materials within a larger story of nature. Such practices are multiple, hybrid, transdisciplinary. By liberating the *context of discovery* in this way, in place of theories and mimetic representations emerge *new practices* and *epistemic things*. These are not valued in terms of *truth* and/or *error*, but rather as *strategies* that promote *generative diversity*, *asymmetry*, and *disequilibrium*.

Effusive methods cherish anomalies. For example, consciousness makes us aware of non-linear matter which may not be aware (of) itself. Soils and oceans, all that is too ephemeral (*consciousness* itself) to be matter or format, all that is materially *unassuming*. Rachel Armstrong writes “radiation interacts with matter, is created by matter, can create matter and is emitted by matter but is not actually matter. Radiation is massless and takes up so little volume that it is just too ephemeral to ‘be’ matter.”²

Our oceanic tools are the *paradoxical* and the *unquiet* – disturbances that suck in and throw out energy.

Strategies of ill-disciplined organization that make life simultaneously possible and impossible, which is perhaps one route to the ecstatic.

Consciousness reveals to us dissipative voids alongside a capacity to navigate in the dark. And so, *shaping* – despite ourselves. Life will have life.

¹ The distinction is made by Hans-Jörg Rheinberger, director of the Max Planck Institute for the History of Science in Berlin, and cited by Henk Borgdorff in “Artistic Practices and Epistemic Things”, in *Experimental Systems: Future Knowledge in Artistic Research* ed. Michael Schqab, Leuven University Press (2013), p.113.

² Armstrong, R (2016), *Star Ark: A living, self-sustaining worldship*, Chichester, UK:Springer/Praxis, p.36.

TABULA RASA

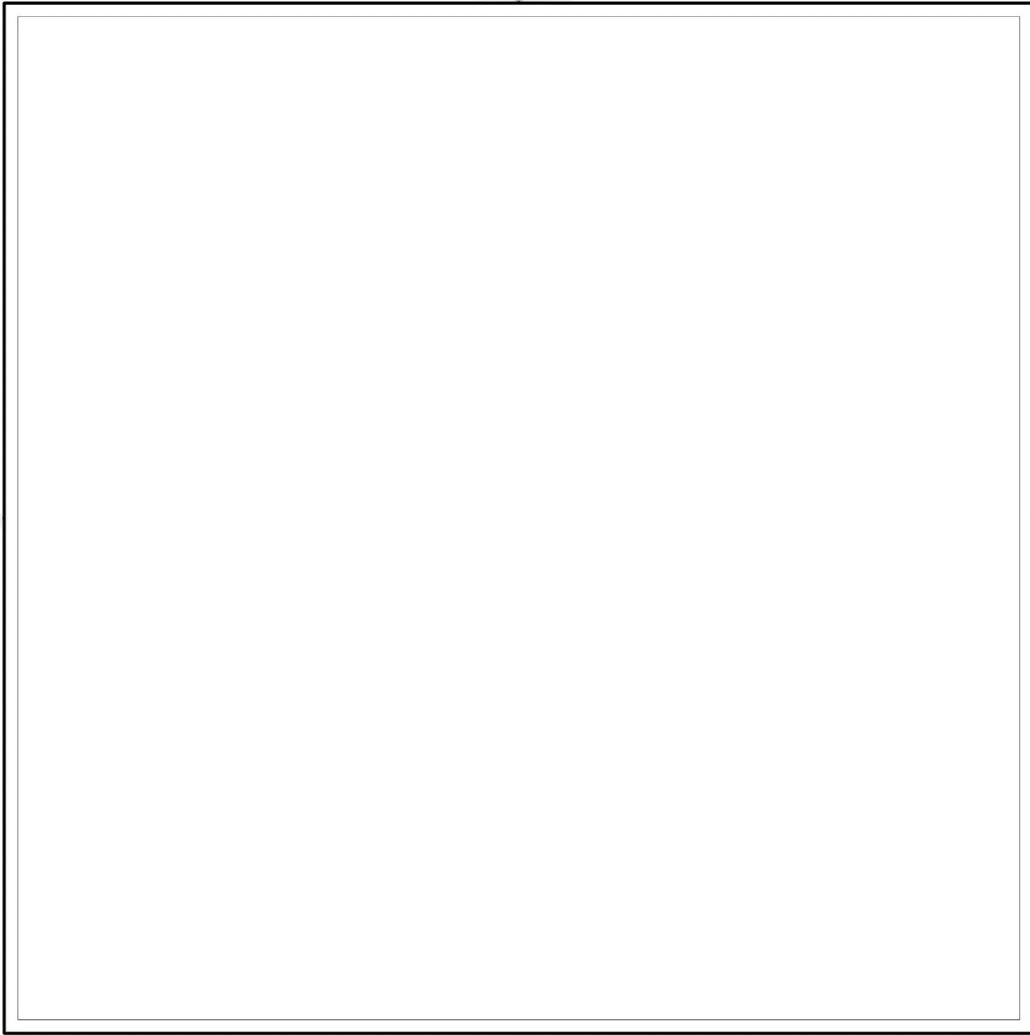
FORMAT

STYROFOAM

SILENCE

MEDIUM

RASURA TABULAE



thrumming

MEDIUM

LIQUID LIFE

Scale of Miles.

OCEAN-CHART.

References:

- Agamben, Giorgio, and Daniel Heller-Roazen. *Potentialities: Collected Essays in Philosophy*. (Stanford, Cal.: Stanford UP, 1999).
- Aristotle, *De anima*, in *Aristotle in Twenty-Three Volumes*, vol.8: *On the Soul, Parva Naturalia, On Breath*, trans. W.S. Hett (Cambridge, Mass.: Harvard University Press, 1986).
- Armstrong, Rachel, (In press), *Soft Living Architecture: An alternative view of bio-informed design practice*. London: Bloomsbury Academic.
- Armstrong, Rachel, *Star Ark: A living, self-sustaining worldship*, Chicester, UK: Springer/Praxis, 2016).
- Armstrong, Rachel, *Vibrant Architecture: Matter as a codesigner of living structures*, (Berlin: Degruyter Open, 2015).
- Bird, J. and Di Paolo, E., *Gordon Pask and his maverick machines*, (Cambridge: MIT Press, 2015).
- Böhme, Gernot, 'Atmosphere as the Fundamental Concept of a New Aesthetics', *Thesis Eleven*, 36(1), (1993), pp. 113-126.
- Böhme, Gernot, 'Acoustic Atmospheres. A Contribution to the Study of Ecological Aesthetics'. *Soundscape: The Journal of Acoustic Ecology*, 1(1), (2000), pp. 14-18.
- Borgdorff, Henk, "Artistic Practices and Epistemic Things", in Michael Schwab (ed), *Experimental Systems: Future Knowledge in Artistic Research*, (Leuven: Leuven University Press, 2013), p.113.
- British Library. 20 April 2016. "The thinking machine: W Ross Ashy and the homeostat. [online]. Available at: <http://blogs.bl.uk/science/2016/04/the-thinking-machine.html>. [Accessed 7 June 2017].
- Casey, Edward S., *Representing Place: Landscape Painting and Maps*, (Minneapolis – London: University of Minnesota Press, 2002).
- McLuhan, Marshall. *Understanding Media: The Extensions of Man*. (Boston, Mass.: MIT, 1994).
- Lee, M., *Oceanic ontology and problematic thought*, NOOK Book/Barnes and Noble, British Library. 20 April 2016. "The thinking machine: W Ross Ashy and the homeostat. [online]. Available at: <http://blogs.bl.uk/science/2016/04/the-thinking-machine.html>. [Accessed 7 June 2017]. [online] Available at: <http://www.barnesandnoble.com/w/oceanic-ontology-and-problematic-thought-matt-lee/1105805765>. [Accessed 19 June 2017].
- Pallasmaa, Juhani, "Voices of Tranquility. Silence in Art and Architecture", in Marc J. Neveu and Negin Djavaherian (eds), *Architecture's Appeal. How Theory informs Architectural Praxis*, (New York: Routledge, 2015).
- Prigogine, I., *The End of Certainty: Time, Chaos and the New Laws of Nature*. 1st edition, (New York: The Free Press, 1997)
- Schrödinger, E., *What is life? With mind and matter and autobiographical sketches*, (Cambridge: Cambridge University Press, 2012).
- Sontag, Susan, "The Aesthetics of Silence" in Susan Sontag *Studies of Radical Will*, chapter 1, (New York: Anchor Books, 2002), pp. 3-34.
- Steinberg, P. & Peters, K., "Wet ontologies, fluid spaces: giving depth to volume through oceanic thinking", *Environment & Planning D. Society & Space*, 33, pp. 247-264.
- Stengers, I., *God's heart and the stuff of life*. Pli, 9, pp.86-118.
- von Bertalanffy, L., *Modern theories of development: An introduction to theoretical biology*, (Oxford: Oxford University Press, 1933).
- Zeleny M. "What is autopoiesis?" In: Zeleny M. (ed.) *Autopoiesis: A theory of living organization*. Elsevier North Holland, New York NY: 4–17.