

MATERIALLY IMAGINING EARTH'S ATMOSPHERES: REMEMBERING/ FUTURING THE AIR IN BREATHABLE ARTWORKS

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ATMOSPHERIC HUMANITIES

The air is hard to perceive as a material reality because we are so entangled in it. To remedy this “forgetting of air” (Irigaray, 1999) some artists from the early 1970s onward have moved beyond visual representation to create a new *æsthesia* of air, working with inhalable gases, odorous molecules and other volatile substances to bring the atmosphere back into people’s sphere of experience. Many of their works critically engage with the alarming changes

of our aerobic environment in the context of the Capitalocene by mediating material encounters with past tropospheric conditions and potential atmospheric becomings –both material and temporal. This article examines a selection of contemporary breathable ‘airworks’ that provide a sensory experience and an embodied understanding of evolving human-and-other-than-human-made ‘airscales’ across deep time and human time.

What is climate change if not a consequence of failing to respect or even to notice the elemental medium in which we're immersed? Is not global warming, or global weirding, a simple consequence of taking the air for granted? (Abram, 2018, p. 263)

INTRODUCTION

In *The Breath of Life*, North-American naturalist John Burroughs beautifully defines the nature of the life of *aerobic animals*:

“Our most constant and vital relation to the world without is a chemical one. We can go without food for some days, but we can exist without breathing only a few moments. Through these spongy lungs of ours we lay hold upon the outward world in the most intimate and constant way. Through them we are rooted to the air. [...] The act of breathing well illustrates our mysterious relations to Nature –the cunning way in which she plays the principal part in our lives without our knowledge” (Burroughs, 1915, pp. 50-53).

In these last three words Burroughs encapsulates both the essence of what anthropologist Philippe Descola (2013) has coined ‘naturalist ontology’ –coincident with the Western dualistic tradition separating Humankind from Nature– and the tendency of modern westerners to be oblivious to the constant and mutually-constitutive exchanges between their bodies and the more-than-human world on a shared “breathing planet” (Abram, 2010, p. 221).

Although it penetrates us from the minute we are born, the air we breathe in-and-out –up to 30,000 times a day– tends to barely brush against our conscious attention, precisely because we are so entangled in it. As Luce Irigaray puts it: “Always there, [air] allows itself to be forgotten” (Irigaray, 1999, p. 8). Often considered an immaterial abstraction, a near emptiness formerly known as “ether” (Olwig, 2011), the air is, however, an utterly material reality, albeit manifold, diffuse, elusive and fluctuating¹. But it is a ‘materiality’ that we usually fail to acknowledge as such until it

becomes so agitated or so pervaded with noxious pollutants that we start to feel ‘the stuff’ touching or entering our bodies, and disrupting our milieu.

While it took hundreds of millions of years for the Earth’s atmosphere to become enriched with just enough oxygen to allow the life of atmospheric creatures, it took barely three centuries for a small part of humanity to make it nearly unbreathable. Subject to radical changes resulting from human activities, the air has now become a major medical, socio-political and techno-scientific concern. Yet, despite the growing literature on the biogeochemistry, relationality, affectivity, and performativity of air(s), this multiplicitous, contentious ‘hyper-object’ (Morton, 2013) largely continues to escape our awareness—at least in the Global North where our experience of anthropogenic subversions of the atmosphere remains limited. As literary theorist Eva Horn writes: “The abstraction of the air is the price for the immense and vital body of knowledge that modern science has gathered on the atmosphere” (Horn, 2022, para. 13) In our Western societies, knowledge (more or less abstract) has indeed largely superseded experience in environmental matters (Lieutaghi, 1983, p. 7; Abram, 1997, p. 259; Knebusch, 2008, p. 243; Pierron, 2023, p. 21).

It is in part to remedy this ‘abstractness’ of air, that, since the 1960s, some artists have endeavored to create a new *aesthesia* of air—in the original Greek sense, ‘to perceive’—pushing it to the forefront of our perception and consciousness by using it, not as a mere subject, but as a medium. Quite well-known are the works of Hans Haacke, Robert Morris, Marinus Boezem, Judy Chicago, Michael Asher, Robert Barry, Art & Language, Preston McClanahan, John Van Saun, and several others, who used air for its haptic, sonic, meteorologic or dynamic qualities. Such airworks, involving wind, drafts, vapor, smoke, gases, bubbles as well as aerodynamic or inflatable structures, are indeed relatively well-documented (Burnham, 1967; Sharp, 1968; Lippard, 1973; Herwig and Thallemer, 2005; Bakke, 2006; Connor, 2017; Brace, 2017; Moon, 2019). Yet another kind of airworks have received much less attention

within the context of the “atmospheric turn” (Tani, 2020, p. 79) in the arts: the ones using air for its *breathable* quality, engaging the body through one of its most vital functions.

In that regard, Gordon Matta-Clark's *Fresh Air cart* (1972) can be considered a seminal piece, one of the firsts—if not the first—intentionally breathable artwork directly dealing with atmospheric concerns². This pioneer piece reflects the unprecedented importance given to ecological considerations in the Western public sphere in a time regarded as a turning point for political ecology. In 1970, the *Clean Air Act*, originally initiated in 1963 in the United-States, was greatly amended by Congress, establishing new, stricter standards and more ambitious air pollution reduction goals. But according to Fabien Locher and Grégory Quenet, “the birth of environmental history is generally placed in August 1972, with a special issue of the *Pacific Historical Review* and a famous article by Roderick Nash” (Locher & Quenet, 2009, p. 8) entitled *Environment and Americans: The Problem of Priorities*. Two months before, the United Nations Conference on the Human Environment, held in Stockholm in June, asserted as its first principle the fundamental right to “adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being” (United Nations, 1972, p. 4), which includes the right to breathe ‘clean’ air. When it was first presented in September 1972, *Fresh Air Cart* was, therefore, undeniably echoing the political recognition of the anthropogenic disruptions of the biosphere and of the risks and (slow) violence (Nixon, 2011) that come with it.

A participatory performance, the work consisted of a small mobile vehicle equipped with two seats, an umbrella and oxygen tanks set up on a sidewalk of Manhattan's Financial District. Matta-Clark—sometimes accompanied by actress Ginger J. Walker and artist Ed Baynard—invited passersby to breathe in “pure” air (79% nitrogen, 21% oxygen) for a 90-second interlude³. Although in a slightly whimsical way, *Fresh Air Cart* signaled that air “of a quality that permits a life of dignity and well-being” (United Nations, 1972, p. 4)

had already rarefied. As Ed Baynard recounted in the *New York Post* at the time, “nobody could believe it was just a nice thing, that it wasn’t a rip-off. What they didn’t seem to realize is that we’ve all been ripped off already. We’ve just been offering souvenirs of what used to be” (Hodenfield, 1972, p. 10). The work thus presented ‘clean’ air as something to ‘remember’, no longer to be experienced in natural breathing conditions, and maybe soon to be commodified –the doubts expressed by people about the absence of a fee to pay sadly illustrating this very real possibility⁴. Situating the performance around Wall Street was also hardly coincidental, hinting at the indirect yet systemic underlying causes of air pollution: neoliberal “limitless capitalist accumulation, overproduction and ongoing colonial relations” (Calvillo, 2023, p. 27). Barely a month later, on October 1st, the Club of Rome’s report, *The Limits to Growth*, was officially published (but the results had already been presented in 1971), suggesting the impossibility to sustain exponential economic growth within planetary limits...

Following Matta-Clark, numerous artists have worked with gases and invisible airborne materials to critically engage, through the act of breathing itself, with the “new respiratory condition” (Macé, 2022, p. 12) of the Capitalocene⁵.

In an effort to make “the air conditions explicit” (Sloterdijk, 2009, p. 84), several contemporary artists have devised sensory experiences that confront audiences with the current toxic realities of the air in various parts of the globe⁶. Their works, grounded in the premise that we cannot resist what we cannot perceive, provide a sensory knowledge of atmospheric risk through material and affective encounters with scents mimicking the olfactory signatures of various forms of volatile pollutants (Muller, 2021). Although everything that smells isn’t necessarily toxic, and everything that is toxic doesn’t necessarily smell, using “odorivectors” (Holley, 1999, p. 54) remains an efficient way to bring the (troubled) materiality of air to the fore. As Gaston Bachelard wrote: “for material imaginations, what are the most strongly substantial

qualities of air? Odors. [...] air is above all the vehicle of odors” (Bachelard, 2016, p. 176).

Other artists –such as Emily Parsons-Lord, Edwige Armand, Allie Wist, and Anna May Kirk– have expanded their scope to include past and future atmospheres, reconstructing ancient tropospheric conditions (*remembering* the air⁷) and anticipating potential atmospheric becomings (*futuring* the air⁸) in order to reflect on the present-day air crisis. In this article, I will discuss how their works articulate narratives of evolving human-and-other-than-human-made *airscales* across deep time and human time, and offer an embodied understanding of atmospheres via materials meant to be inhaled⁹.

ATMOSPHERIC TIMELINES

While scientists use knowledge of the Earth’s atmospheric history as well as past records to anticipate the future –as articulated in the 2016 National Academies of Sciences, Engineering, and Medicine report, *The Future of Atmospheric Chemistry Research: Remembering Yesterday, Understanding Today, Anticipating Tomorrow* (2016) – some artists have extended this framework into the arts.

Since 2014, Australian artist Emily Parsons-Lord –based on the land of the Wurundjeri Woi Wurrung peoples of the Kulin Nation– has been practicing the art of atmospheric recomposition drawing from research in paleoclimatology and atmospheric chemistry. Her first performances, *Different Kinds of Air, a Plant’s Diary* (2014) and *The Airarium* (2015), both featured a counter top above which suspended plastic bags contained several chemically distinct ‘airs’, with various proportions of oxygen, nitrogen, carbon dioxide and other gases. Visitors were invited to sample each one through a stainless-steel straw while engaging in discussions about the biogeochemistry of the Earth. Adopting a form of embodied rhetoric in which language and experience function together,

Parsons-Lords insists that “in both works, the linguistic and the material are co-constitutive elements required to communicate their meaning” (Parsons-Lords, 2021, p. 48). These discursive and experiential breathing experiments allowed participants to compare the sensory qualities of each air – like ‘taste’ and heaviness – but also their various physiological effects – shortness of breath, dizziness, surges of energy, acceleration of the heart rate – which made tangible our dependence on the materialities of air.

Parsons-Lord’s early performances also underscored the perpetual state of flux of the atmosphere, forged and re-forged *ad infinitum* under the influences of a multiplicity of organisms, infrastructures, agencies, and feedback loops. By enabling audiences to travel across geological ‘air-times’, she highlighted a crucial reality: the air has not always been as it is today, which means it will not remain the same in the future either. To emphasize this, several of Parsons-Lord’s airworks, including *The Airrarium*, included what the artist called *future air*, containing high levels of sulfur hexafluoride, a synthetic greenhouse gas whose global warming potential is 22,800 times higher than carbon dioxide. In *The Confounding Leaving* (2016), a minimal installation in a seemingly empty white gallery, visitors could press a button to release and inhale this composition, offering “a visceral connection with the future of air” (Parsons-Lord, 2016, para. 1). Though invisible and odorless, sulfur hexafluoride lowers the voice when inhaled, making its presence undeniably perceptible. The installation additionally confronted visitors with a dilemma: was the desire to experience this *future air* worth letting it leak into the atmosphere considering its noxious impact for generations to come?

The artist further investigated the collision of ‘air-times’ in *The Great Dying*. For this immersive installation, she reproduced the atmosphere of the largest extinction event in Earth’s history, which occurred approximately 252 million years ago, between the Permian and Triassic periods. During this event, about 90% of marine and terrestrial species

disappeared in the wake of rapid climate change and atmospheric hypoxia –a drastic decrease in oxygen levels– combined with the highest carbon dioxide concentrations in the history of the Earth (Benton, 2003). Examining the composition of this ancient air holds particular relevance today as “the causes of that mass extinction bear some striking similarities to what’s happening today” (Berardelli & Niemczyk, 2021, para. 3). In fact, human-induced environmental changes are occurring at an even faster pace. In 2015, the levels of carbon dioxide in the atmosphere had reached their highest point in 3 million years, while the current rate of species extinction is unprecedented in 65 million years (Fressoz, 2016, p. 45). This air from the past –incapable of sustaining aerobic life– might then very well be that of our future... As a way of letting us experience this dire prospect, Parsons-Lord built a small temporary white cube beneath an elevated highway during the Bristol Biennial in 2016. As air replicating the characteristics of the Permian-Triassic atmosphere gradually filled the sealed room, a device continuously measured oxygen levels warning participants of the growing danger. When O₂ levels dropped below 18%, an alarm sounded and the space was evacuated and reset. Visitors who entered the installation and experienced the discomfort of dyspnea, were confronted with the stark reality that, while the doors of the white cube could open to provide an escape, there is no such exit on a planetary scale.

While Parsons-Lord worked exclusively with gases to create experiential timelines of atmospheric changes, other artists have engaged with a broader range of sensory modalities to evoke different air-times. One such example is the art-science project *Atmosphère primale*, led by French artist Edwige Armand in collaboration with members of the non-profit organization Passerelle Arts Sciences Technologies¹⁰. Initiated in 2019 and exhibited in its final form at the Musée du Saut du Tarn (France) in 2024, this project immersed audiences in the atmospheric conditions of seven geological epochs –from the planet’s formation 4.5 billion years ago to a speculative

(yet plausible) future based on the latest Intergovernmental Panel on Climate Change (IPCC) report.

Guided by the question, ‘how can we breathe the Earth’s unbreathable atmospheres’, the creative team decided to engage with ‘atmospheric qualities’ beyond mere (un)breathability, drawing on a multisensory approach. Each epoch was assigned a color—green for the Devonian era, red for the hot Triassic period, blue for the Holocene, etc.—and was paired with a soundscape and a scent. However, rather than attempting to replicate the atmospheric ‘smellscapes’ (Gade, 1984; Porteous, 1985) of these epochs—many of which would not even have allowed breathing, let alone smelling—the team instead used a combination of odorants, mist, and temperature modulations to emulate the sensory qualities of these atmospheres: extreme heat, humidity, dryness, cold, etc. The Snowball Earth period (-720 to -635 million years ago), for instance, was represented by a blend of eucalyptus, ginger, peppermint, silver fir and lemon. Beyond pure olfaction, several molecules in the formula provoked a sharp, cooling sensation through the activation of the trigeminal nerve¹¹.

Although the sense of smell alone can “mediate the atmospheric matter in which the human body is immersed” (Baudequin & Cassin, 2024, p. 51), it did not function autonomously in *Atmosphère primale* but instead intersected with other sensory modalities to create a layered, trans-modal experience of Earth’s atmospheres that extended beyond mere representation. In the immersive installation *Espace sensible*, the culmination of the project, four atmospheres were ‘staged’ sequentially, each filling the space—a simple white cube with a sandy floor—with corresponding scents, sounds, lighting, and other environmental conditions¹². In the *Snowball Earth* segment, a white mist enveloped the room while a glacial soundscape played in the background, reinforcing the physiological perception of cold induced by the scent. For the ‘post-Anthropocene’ epoch, a foreboding purple haze and unsettling smoky scent—with a distinctively artificial note of melted caramel—suggested an upcoming atmosphere thick

with industrial emissions, bordering on the unbreathable, on a planet where the continuous rise in CO₂ emissions have led to global warming above the tipping point of 2°C.

Albeit in different ways, both Parsons-Lord's and Armand *et al.*'s projects translate geochemical data and scientific projections into experience. Drawing away from mere representationalism, their approaches explicate atmospheric re-configurations 'from the inside', by engaging the breath, the chemical senses and other bodily perceptions besides vision, fully embracing the non-representability of atmospheres. Through intimate and felt encounters with air's evolving materialities, their works provide audiences with a sense of both embodied and embedded temporalities, addressing the challenges of 'planetary' thinking (Garcia-Gonzalez *et al.*, 2024). As Armand suggests, such projects are about "re-learning to live in durations, not fragments of successive moments" (Armand *et al.*, in press)—and taking responsibility for the short and long-term consequences of human activities on the atmosphere.

THE LIFE (AND DEATH) OF PLANTS

By explicating the tangible effects of the shifting balance between oxygen and other gases in the atmosphere over (non-linear) time, the works previously discussed highlight the fragility of the material (gaseous) conditions that sustain aerobic life—human in particular. Other artists have created artworks that more directly engage with past, present, and future air as shared and co-constructed with other-than-human beings, through "re-sensitising our bodies to the multispecies smellscape that support all life on Earth" (Davies, 2023, p. 120).

The fluctuations of Earth's atmosphere are indeed intrinsically linked to both geological and biological activity. As postulated by the (debated) Gaia hypothesis in the 1970s, the organic and the inorganic are deeply integrated, functioning

together as a complex, self-regulating system that maintains the conditions for life on the planet¹³. The extreme thermodynamic disequilibrium of Earth's atmosphere, in particular, results from the activities of living organisms, which both produce and depend on the air, using it as a resource as well as a repository for waste (Lenton, 2003). Therefore, we all inhale the byproducts of other living creatures, first and foremost, plants, the original architects of atmospheric oxygenation. As Emanuele Coccia writes in *The Life of Plants*, the leaf is “the climatic laboratory par excellence, the oven that produces oxygen and frees it into space, the element that renders possible the life, the presence, and the mixture of an infinite variety of subjects, bodies, histories, and worldly beings” (Coccia, 2019, p. 33).

However, plants themselves are now affected by anthropogenically driven environmental changes, particularly rising temperatures and increased CO₂ levels. In a warming climate, abiotic stress alters plant metabolism and their emissions of biogenic volatile organic compounds (BVOCs). In 2023, American artist-scholar Allie E.S. Wist explored the relationship between human-driven climate change and biogenic emissions in her installation *Drought Atmosphere*, drawing on research that proves heat stress significantly increases plants' emissions (Laothawornkitkul *et al.*, 2009; Zhao *et al.*, 2017; Rinnan *et al.*, 2020) which, in turn, impacts air quality and climate. A 2022 study revealed that the chiral forms of certain plant monoterpenes –such as alpha-pinene, beta-pinene, and limonene, which are all fragrant to the human nose– are increasingly released by trees during droughts, seemingly as an adaptive mechanism to seed clouds and induce rainfall (Byron *et al.*, 2022). Inspired by this discovery, Wist blended perfume-grade versions of these compounds to be sprayed inside a green plexiglass box suspended from the ceiling. By placing their heads inside this *aromatorium*, visitors could get a whiff of what might soon be the dominating smellscape of forested areas if global temperatures continue to rise: no longer shaped by healthy vegetal life but by plants' distress on a warming planet¹⁴.

Although minimal in form, Wist's work underscores a critical yet often overlooked reality: both the gaseous composition and the sensuous qualities of the air are inextricably tied to the lives of Earth's human and non-human inhabitants. What we might perceive as a simple smell can, in fact, reflect alarming environmental shifts and indicate the increasingly precarious living conditions of other air-bound creatures. As habitats deteriorate and organisms struggle to adapt or disappear, their chemical contributions to the atmosphere shift, or vanish altogether.

This phenomenon –the link between biodepletion and the reformation of atmospheric perceptible qualities– was already observed in 19th-century North-America by Henry David Thoreau, who lamented in *A Week on the Concord and Merrimac Rivers* that “the gales do not at present waft to the voyager the natural and original fragrance of the land, such as the early navigators described [because of] the loss of many odoriferous native plants, sweet-scented grasses and medicinal herbs, which formerly sweetened the atmosphere, and rendered it salubrious” (Thoreau, 1849, p. 374). Such alterations or simplifications of bioregional smellscape are now being studied by conservation scientists as they can negatively impact ecosystems, considering that plants, bacteria, insects, and other animals rely heavily on chemical cues for survival (Renou *et al.*, 2021). Faced with such manifold implications, we are beginning to understand how much we still don't know about the cascading and feedback effects of current atmospheric reconfigurations.

Based in Sydney –on the lands of the Gadigal people of the Eora Nation– multi-disciplinary artist Anna May Kirk similarly reflected on shifting aircapes in relation with vegetal life in *Letting Leak* (2019), an installation presented at the Casula Powerhouse Arts Centre. Before its conversion into an exhibition space, the venue was a functional coal-burning powerhouse. Kirk thus engaged with the building's industrial history to craft a narrative around climate change. “Here, she writes, the deep past evaporated into the present, filled with the potential to climatically alter the future” (Kirk, 2019, para. 1).

Australia's black coal formed approximately 299 million years ago during the Permian Period, originating largely from plant matter that accumulated during The Great Dying. Today, in the midst of the sixth mass extinction event, the combustion of this ancient vegetation turned into rock is a major contributor to climate change, with coal burning accounting for 40% of global greenhouse gases emissions (Ritchie *et al.*, 2020). *Letting Leak* telescoped these planetary and temporal scales, intertwining deep time and human time in a single, minimal-looking installation: water vapor leaking from an air grid on a red platform in the middle of the exhibition space. This barely visible mist, subtly recalling the steam produced by active coal-plants and the fumes of fossil fuel combustion, was scented to evoke three distinct periods.

For the Permian period, the artist selected notes of fern, moss, wet earth and pine –aromas unearthing the lush swampy forests covering the continent at the time (Finch & Finch, 2022). Dominating these ancient landscapes were *Glossopteris* trees, an extinct group whose softwood resembled *Araucariaceae* conifers but were distantly related to seed ferns –explaining the artist's choice to incorporate both fern and pine notes. The present was encapsulated by the familiar scents of local flora, including eucalyptus, wattle, wild fennel, tea tree, native violet, gymnea lily, and indigofera. For the future, Kirk assembled a darker aromatic palette –smoke, dry grass, weeds, and blackberry¹⁵– conjuring an Australian landscape devastated by wildfires and heatwaves, where only the most resilient species endure¹⁶. By using botanical smellscape to evoke and hybridize different air-times, “by dissolving past and future into the sensorial present” (Abram, 1997, p. 206), Kirk underscored the fundamental reciprocity between atmosphere and plant populations while insisting on their vulnerability to abnormally rapid climate changes. To continue burning coal and other fossil fuels isn't just polluting the atmosphere, it is to burn and condemn the very organisms that shape the air as we know it. Rather than employing pollution scents to instill a sense of the air's toxicity in

our own bodies, as seen in other olfactory artworks (Muller, 2021), Kirk's approach shed light on the consequences of our actions on other-than-human beings –beings upon whom our own survival ultimately depends.

Positioning the act of breathing within both a situated and planetary ecology, Wist and Kirk remind us that we never breathe alone, affirming our embedment in the 'conspiring'⁷ biotic community: we only breathe 'with' and 'amongst'. Through their use of odorous materials extracted from or inspired by plants, their works also illuminate the complex interactions and enmeshments between anthropogenic and biogenic emissions of various natures: the atmosphere is not merely a collection of gases but a shared and dynamic medium, a space of multispecific chemical communications, exchanges and reciprocal influences, that materially and sensorially records –as well as enforces– life's entanglements and evolutions.

CONCLUSION

As the emergence of breathable art in the 1970s coincided with the rise of ecological awareness in political and public discourse, the multiplication of such artworks in the last decade reflects the now absolutely critical need to rethink our being-in-the-world as a "being-in-the-air", or, more precisely, as a collective and multispecific "being-in-the-breathable" (Sloterdijk, 2009, p. 48). Whether they use gases or odorous molecules, these works that are primarily meant to be inhaled are fostering a renewed, embodied understanding of air, "that embraces vulnerability, interconnectedness, and materiality" (DiCaglio, 2022, p. 59). Finally, as they engage though the breath with the reconstructed or fictionalized materialities and qualities of atmospheres –past, present and future– the artworks discussed in this article also function as "interscalar vehicles" (Hecht, 2018, p. 113), opening up our imagination, connecting disparate

temporalities and scales, and allowing us to move through deep time and human time simultaneously in an air that is an abstraction no longer.

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NOTES

1 The air that makes up the protective atmosphere of the Earth is constituted of a combination of gases (nitrogen, carbon dioxide, oxygen, argon, as well as other noble and greenhouse gases) carrying water vapor, biogenic and anthropogenic VOCs, particulates, and large quantities of micro-organisms sometimes referred to as the *aerobiome*. Given the complex and unfixed material composition of air over space and time, scholar Nerea Calvillo (2023) suggests to use the plural “airs” (p. 24) to orient attention to the variations of this multiscalar, ever-evolving mixture.

2 This work is sometimes jointly attributed to Gordon Matta-Clark and Chilean artist Juan Downey. According to other sources however, the work seems to have been the initiative of Matta-Clark alone, under the pseudonym of George Smudge. When asked about this, Liza Béar, who was close with both artists at the time and *used the Fresh Air Cart* herself, stated that she had never heard that Downey was involved in the project and had never seen him near the work (Personal communication with Liza Béar over the phone and by email, May 2020). In fact, it seems that Downey did not initiate the project but produced the video documentation.

3 One can wonder what “clean,” “fresh,” or “pure” air entails. Gordon Matta-Clark seems to have simply reduced breathable air to its most important

basic gaseous constituents, N₂ and O₂, eliminating the 1% of other gases and all the non-gaseous components which can be found in the troposphere, the layer of Earth's atmosphere closest to the ground. If such a material *simplification* can be considered as "fresh air" is open for debate. In *Oxygen Bar* (2005), artist Laurie Palmer referenced Matta-Clark's performance but used *Panicum virgatum* to produce the oxygen being breathed in by passerby in the streets of Pittsburgh (Palmer, 2005).

4 In his notes for *Le Grand Verre*, made between 1912 and 1915, Marcel Duchamp had already imagined "establishing a society in which individuals would have to pay for the air they breathe (air meter); imprisonment and rarefied air in the event of non-payment, simple asphyxiation if necessary (cutting off the air)" (Duchamp, 1975, p. 47). Which also brings to mind Raemann's on-going project *Eviar*, transforming plastic water bottles of famous brands into oxygen bottles with breathing masks and capturing pictures of people wearing them. We can also cite the project *Air Slaves* (2017) by members of the new media lab Kitchen Budapest and Baltan Laboratories in Eindhoven, in which "the privatization or personal ownership of air, [was] questioned by inviting visitors to buy or sell clean air produced by the filtration of air through their own lungs." (Landau & Toland, 2022, p. 5) Unfortunately, as Greta Gaard (2022) explains, male *airpreneurs* have actually been monetizing and selling "clean air" for decades, "operating within a neo-liberal economic framework that supports air commodification" (p. 308).

5 Some might prefer to use other terms, such as Anthropocene, Chthulucene (Haraway, 2015), Plantationocene (Gilbert & Epel, 2015), Humilocene (Abram, 2020), Planthropocene (Myers, 2017), etc. My choice to favor the term Capitalocene — which posits that not all human groups are equally responsible for environmental degradations and destabilizations — stems from both personal convictions and the analysis of numerous breathable artworks which often closely associate atmospheric qualities with the socio-economical extractivist logics and systemic domination of neoliberal capitalism.

6 See the works of Peter de Cupere, Simon Lewandowski, Sissel Tolaas, Michael Pinsky, Amy Yao, Susie Kelly, Allie Wist, Lingling Zhang, the Center for Genomic Gastronomy...

7 In this article, *remembering* can be heard both in the sense of conjuring the on-going *forgetting of air* in our modern societies, and in the sense of *reconstructing past airs* in the discussed artworks.

8 "Futuring means thinking systematically about the future, drawing on scientific data, analysing trends, imagining scenarios (both plausible and unlikely) and thinking creatively. [...] Futuring is not predicting futures. It's a way of mixing informed projections with imaginative critical design to invite us to think differently about our current predicaments" (Cooper, 2020, para. 6 & 10).

9 Although this article doesn't allow enough space to discuss their works, other artists such as Cat Jones, agustine zegers or Katie Paterson have also engaged in atmospheric futuring, articulating fictional scenarios through inhalable materials.

10 For the creation of *Atmosphère primale*, Edwige Armand collaborated with composer Thierry Besche, olfactory designers Anne-Charlotte Baudequin and Émilie Bonnard, perfumer Pierre Bénard, assistant perfumer Stel-

la Obam, audionaturalist and sound-recorder Fernand Deroussen, graphic designer Sylvie Chambonnet, as well as Manfred Armand for lighting creation and Hadrien Albouy for the technical production. Scientists and researchers Yves Duthen, Frédéric Garcia, Yves Godderis, Catherine Jeandel, and Elise Nardin were also involved.

11 The trigeminal nerve is the fifth cranial nerve (CNV) which innervates the facial mucosa and the skin. It conveys sensory information arising from contact of a stimulus (physical, thermal, or chemical). It enables tactile, proprioceptive and nociceptive sensations, but also detects and conveys chemosensory signals generated from some ingested or inhaled substances, such as menthol or capsaicin.

12 The initial display of *Atmosphère primale* consisted of transparent smelling glass jars. Their bases broadcasted sound recordings filtered according to the various characteristics of sound propagation within each atmosphere. A video was also presented, showing the gaseous composition of each epoch being released from gas cylinders into the present atmosphere. Such a gesture is highly reminiscent of Robert Barry's *Inert Gas Series / Helium, Neon, Argon, Krypton, Xenon / From a Measured Volume to Indefinite Expansion* (1969), a performance during which the artist released rare gases into the air. Barry, however, was more interested in the invisibility, intangibility and infinite movement of gases than in the idea of acting upon the breath and breathing conditions of aerobic organisms.

13 The symbiotic relationship between organic life and the regulation of the climate and chemical composition of the air—meaning that life normally creates and regulates the conditions for its own existence—was formulated by James Lovelock (1972) and Lynn Margulis as the Gaia Hypothesis. It has been equally embraced and debated ever since by the scientific community.

14 Wist's *Drought Atmosphere* is the counterpart for *Extinct Aromatorium*, which relies on the smell of the Gros Michel banana which has almost disappeared because farmers largely favored the Cavendish banana after the 1950s epiphytosis of *Fusarium oxysporum*, a fungus that decimated Gros Michel banana plantations. Once more, futuring airspaces goes hand in hand with a form of remembering which entails "bringing back 'ghosts' of past ecological states" (Wist, 2022).

15 Introduced in Australia around 1840, blackberry plants were originally used to control soil erosion. However, due to their dense thickets and resilience, they quickly dominated native plants and are now considered an invasive weed of national significance.

16 By confronting geographically situated smellscape from the present and the future, *Letting Leak* also relied on both eco-anxiety and solastalgia. Whereas eco-anxiety refers to the fear of an uncertain future under climate change, solastalgia was coined by Australian philosopher Glenn Albrecht (2005) to describe the distress of witnessing familiar environments altered beyond recognition—a form of homesickness felt while still at home when the familiar is changing in negative ways. By explicitly drawing from Australian land to craft the scents of her work, Kirk even appeals to a form of "regional solastalgia", "produced under the impact of gas fracking, mining, and agribusiness, as they bring unwelcome damage and pollution on a huge scale to ecocultural and bioregional landscapes." (Albrecht, 2012)

17 Many thinkers have recently pondered upon the idea of *breathing-with* as literal “conspiracy” (Berardi, 2018; Choy, 2020; Macé, 2022) or “inter-breathing”: “the atmosphere of this Earth is an elixir born of the inter-breathing of our organism with all these other earthly organisms” (Abram, 2020, p. 18).

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